2012 - JCR Evaluation Form

SPECIES: Elk
PERIOD: 6/1/2012 - 5/31/2013

HERD: EL423 - UINTA

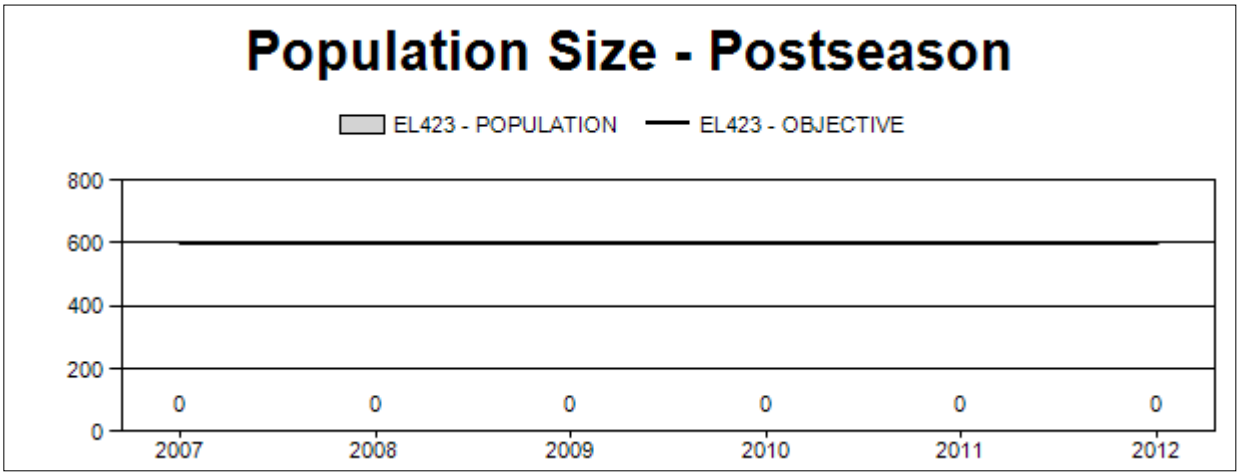
HUNT AREAS: 106-107
PREPARED BY: JEFF SHORT

	2007 - 2011 Average	2012	2013 Proposed
Population:	NA	NA	NA
Harvest:	442	481	500
Hunters:	1,265	1,365	1,400
Hunter Success:	35%	35%	36%
Active Licenses:	1,279	1,403	1,450
Active License Percent:	35%	34%	34%
Recreation Days:	7,200	8,224	8,000
Days Per Animal:	16.3	17.1	16
Males per 100 Females	0	0	
Juveniles per 100 Females	0	0	

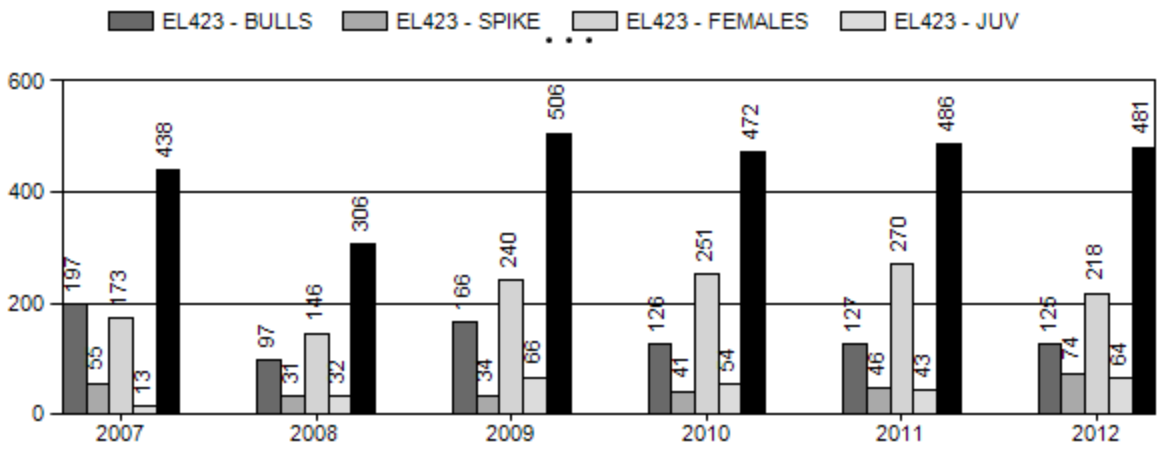
Population Objective:	600
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	NA
Number of years population has been + or - objective in recent trend:	3
Model Date:	None

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

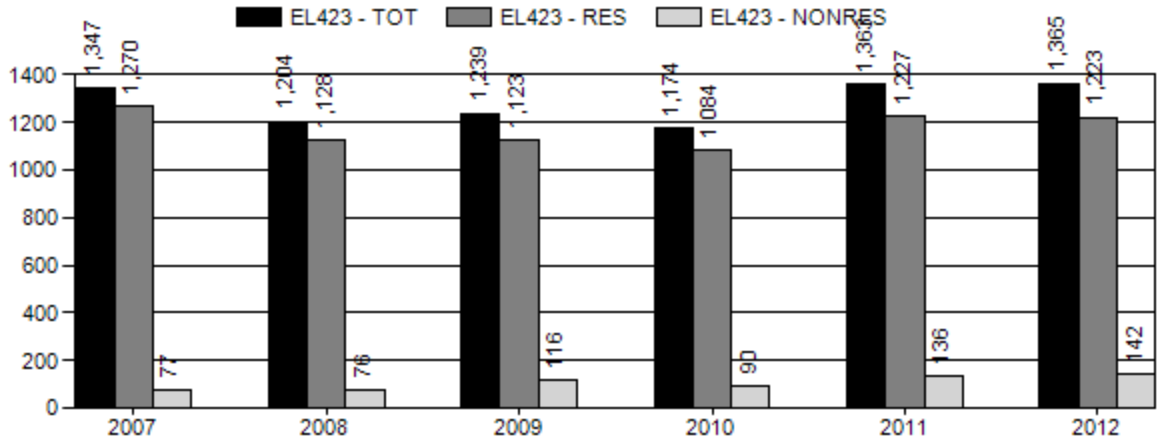
	JCR Year	Proposed
Females ≥ 1 year old:	NA	NA
Males ≥ 1 year old:	NA	NA
Juveniles (< 1 year old):	NA	NA
Total:	NA	NA
Proposed change in post-season population:	NA	NA



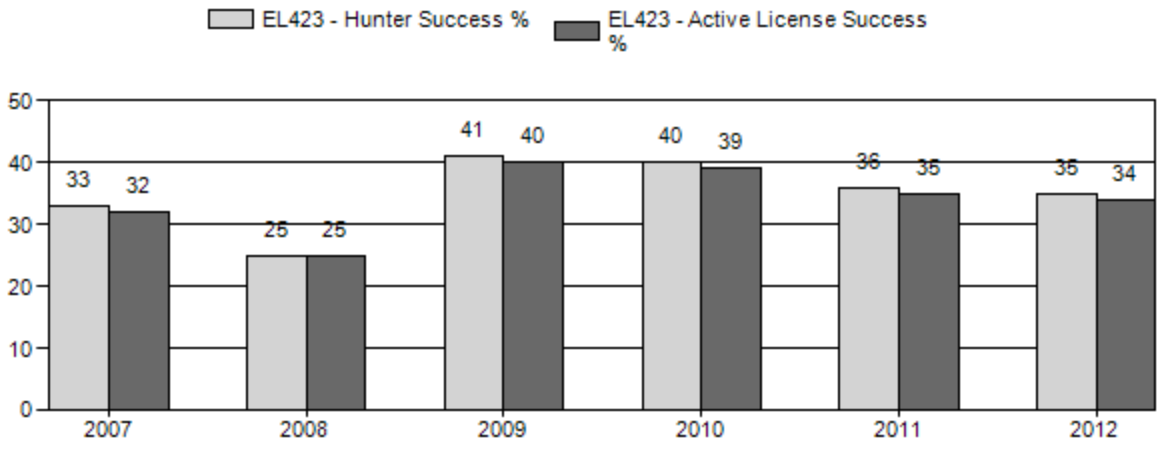
Harvest



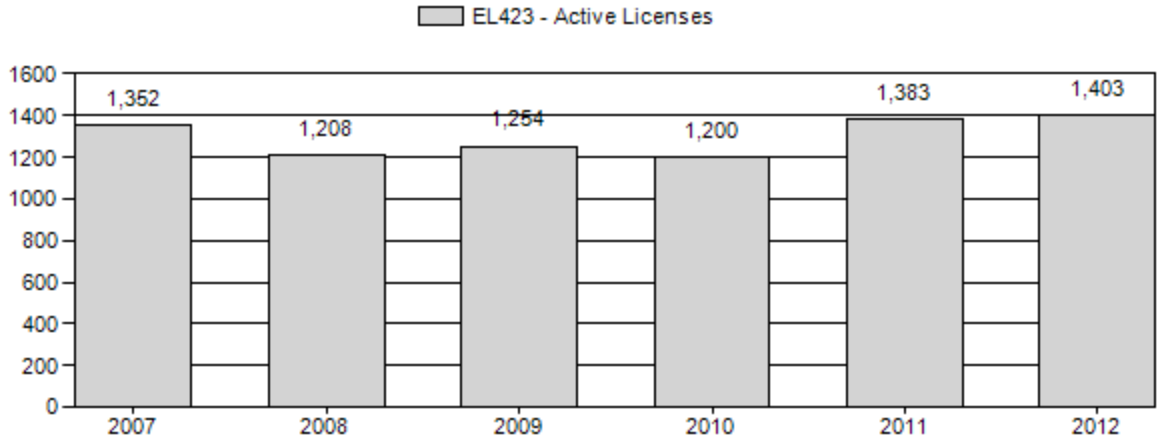
Number of Hunters



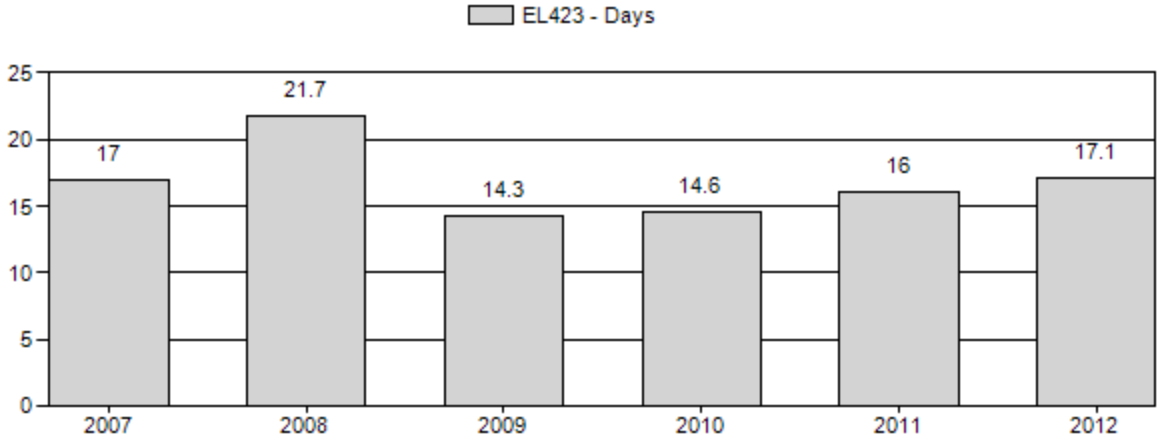
Harvest Success



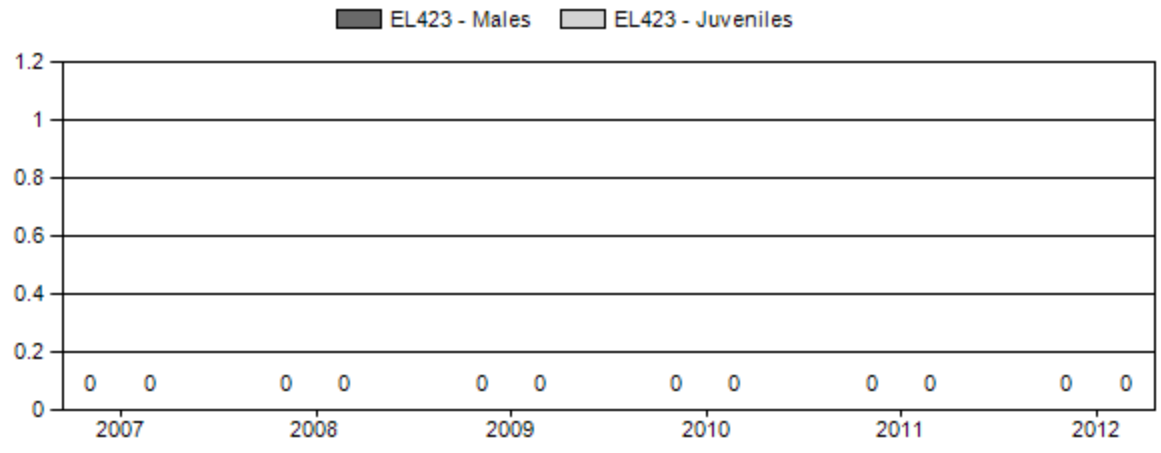
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2013 HUNTING SEASON

SPECIES : **Elk** HERD UNIT : **Uinta (423)**
HUNT AREAS: **106, 107**

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	Limitations
106		Oct. 15	Oct. 31		General license; any elk
		Nov. 1	Nov. 14		General license; antlerless elk
	1	Nov. 15	Dec. 31	50	Limited quota licenses; any elk valid west of the Blacks Fork River or north of Wyoming Highway 410
	4	Nov. 15	Dec. 31	100	Limited quota licenses; antlerless elk
		Jan. 1	Jan. 31		Unused Area 106 Type 4 licenses; valid on private land west of the Blacks Fork River or north of Wyoming Highway 410
	7	Aug. 15	Jan. 31	300	Limited quota licenses; cow or calf valid on private land west of the Blacks Fork River or north of Wyoming Highway 410
107		Oct. 15	Oct. 31		General license; any elk
		Nov. 1	Nov. 14		General license; antlerless elk
	4	Nov. 15	Dec. 31	150	Limited quota licenses; antlerless elk
		Jan. 1	Jan. 31		Unused Area 107 Type 4 licenses; valid off national forest and within the Henrys Fork River drainage
	7	Dec. 15	Jan. 31	50	Limited quota licenses; cow or calf valid off national forest and within the Henrys Fork River drainage
106, 107	Archery	Sept. 1	Sept. 30		Refer to Section 3 of this chapter

Hunt Area	License Type	Quota change from 2012
106	4	+50
106	7	+100
107	4	+50
107	7	+50
Herd Unit Total	**4**	**+100**
	7	**+150**

2007 - 2012 Postseason Classification Summary

for Elk Herd EL423 - UINTA

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2007	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2008	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2009	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2010	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2011	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2012	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0

Management Evaluation

Current Postseason Population Management Objective: 600
Management Strategy: Recreational
2012 Postseason Population Estimate: ~1800
2013 Proposed Postseason Population Estimate: ~1500

Herd Unit Issues

This is an interstate herd shared with Utah. Elk summering in the Uinta Mountains in Utah come to Wyoming to winter. Limited winter range is the driving issue for this herd. With winter range in short supply conflict with agriculture producers becomes an issue. Damage complaints occur on bad winters. Summer damage also occurs on crops in limited areas. Significant efforts have been made by field personnel to alleviate these problems through seasons and by providing fencing materials to protect stored hay. Perceived reduction in livestock forage due to elk grazing is a concern commonly raised by livestock producers.

Local ranchers set up a meeting through the county Farm Bureau Agency in February 2013 to discuss elk management in this herd. During the meeting ranchers expressed significant dissatisfaction with elk in areas of the herd unit. In difficult winters problems have occurred in parts of Area 106 with elk comingling with livestock along the Bear River and Blacks Fork River where cattle feeding operations occur. However, hunters feel that elk numbers in the southeast part of the hunt area are too low and would like that segment to increase. That area is largely public land and historically draws large hunter numbers due to its easy access. We direct pressure onto the northern and western portions of the hunt area with type 7 permits. Type 7 licenses issued in Hunt Area 106 also help deal with an early damage problem on growing crops.

Hunt Area 107 antlerless licenses are used to maintain pressure on elk on the Wyoming side of the state boundary during a depredation hunt in adjacent areas of Utah. Damage complaints on the HA 107 side of the herd unit are typically low, even during the severe winter of 2010/11. However, ranchers are complaining about elk numbers throughout the herd unit and the herd is significantly above the established objective. The late portions of antlerless hunts are designed to target elk that have potential to cause depredation problems while protecting elk in those areas where they can winter with low probability of problems. Unfortunately, there is no good land feature to define this hunt boundary. It has gone through several boundary revisions over the years. Hunters would like to see more elk in accessible public land areas in HA 107. These areas and a small portion of public land in HA 106 are the only significant areas for elk hunter access in the herd unit.

The objective in this herd unit is to ultimately minimize elk damage problems and to have no more than 600 wintering elk. However, it is difficult to manage a herd for limiting damage

based solely on a number, since some years we have exceeded 600 elk, we have also had minimal damage complaints. Elk damage changes relative to many other factors. Currently we are over objective (x3) based on a recent survey. The objective and management strategy were last revised in 1990.

Weather
Weather during 2012 and into 2013 was extremely dry and warmer than normal. The winters of 2011-2012 and 2012-2013 were mild with low snowpack resulting in good over winter survival. However, the dry spring and summer of 2012 negatively impacted summer and winter range forage production. Conditions were better at higher elevations but elk distribution was greatly affected.

Habitat
Habitat data collection has been inconsistently collected in this herd unit and has been absent in the recent past.

Field Data
Elk surveys are flown in cooperation with Utah DNR, most recently in February 2013. The results are shown below. These surveys are trend counts, only, and classification data are not collected (Utah pays for this survey entirely). The 2011 count in Wyoming was higher than previous counts, the result of severe winter weather. The winter of 2012/13 has been very mild but forage availability has been a problem due to severe drought conditions. Damage involving elk has occurred but has not been a huge problem. However, the 2013 count was still very high (the highest since 1992, at least) indicating we are well over objective and need to increase harvest.

	YEAR								
	1992	**1994**	**1996**	**1998**	**2001**	**2004**	**2007**	**2011**	**2013**
Utah West Daggett	920	970	1408	919	923	716	863	No data	1055
Utah Summit	332	131	200	80	101	215	228	268	1006
Wyoming	298	238	635	299	512	446	746	1723	1810
Total	**1550**	**1339**	**2243**	**1298**	**1536**	**1377**	**1837**	**1991**	**3871**

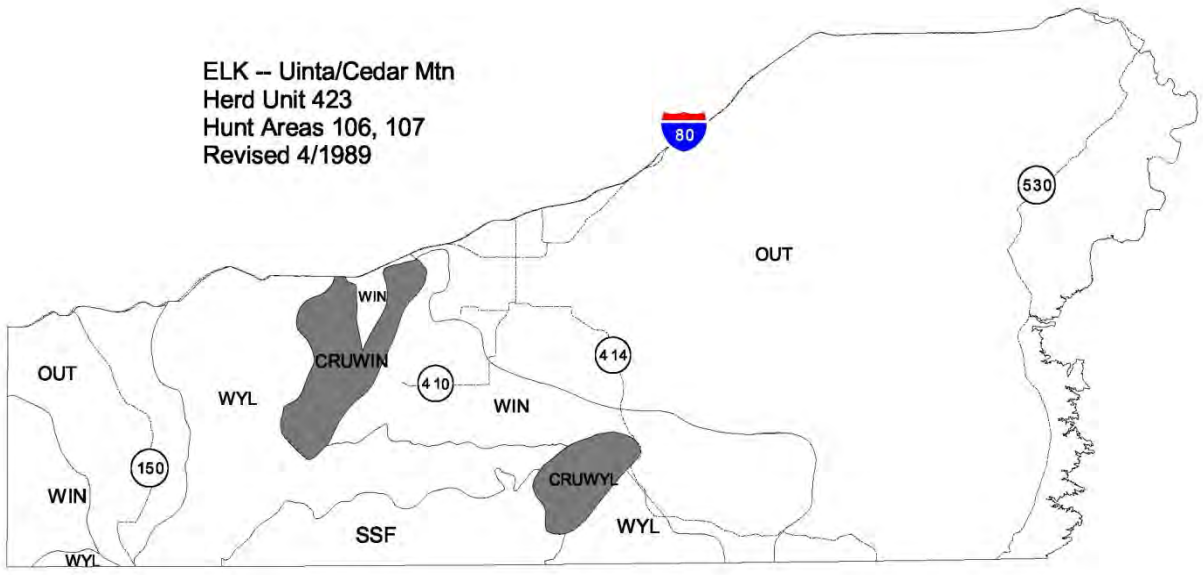
Harvest Data
Harvest and hunter success in Wyoming are driven primarily by weather severity in the Utah portion of this herd. Much of the Utah portion of the herd is wilderness, and elk experience limited human contact in these areas and move only in response to winter weather conditions. Antlerless harvest opportunity was increased for several years in this herd unit. The 2010, 2011 and 2012 season structures offered substantially increased antlerless harvest opportunity to try to reduce the possibility of damage in the herd unit. Those seasons allowed significant antlerless harvest with increases in permits and season lengths. These hunts had good success rates if weather conditions resulted in elk movement out of Utah during the hunting season. For 2013 we are recommending a continuation of this strategy along with increased antlerless hunting opportunity to further reduce elk numbers and damage concerns.

Population
There is no population model for this interstate herd. Weather severity and forage availability are the determining factors in the number of elk that come into Wyoming from Utah during the winter. This and other factors make data collected in Wyoming inconsistent and unreliable.

Since data is very limited in this herd it is very difficult to look at data trends. It is not possible to model this interstate herd. Classification data is not collected. Harvest rates are highly variable due to weather conditions pushing elk into the state from Utah. Harvest survey data do indicate that we have likely had adequate harvest in the past three years to start reducing this herd.

Management Summary

For 2013 season setting we are greatly increasing hunter opportunity for antlerless elk. Comments from landowners in areas around Lonetree and in the north and western portions of area 106 are that elk are still causing problems. We will continue with hunt timing and license management to maximize elk harvest opportunities throughout the season to target elk causing problems in those areas. We anticipate these new season structures will reduce this elk herd.



2012 - JCR Evaluation Form

SPECIES: Elk

PERIOD: 6/1/2012 - 5/31/2013

HERD: EL424 - SOUTH ROCK SPRINGS

HUNT AREAS: 30-32

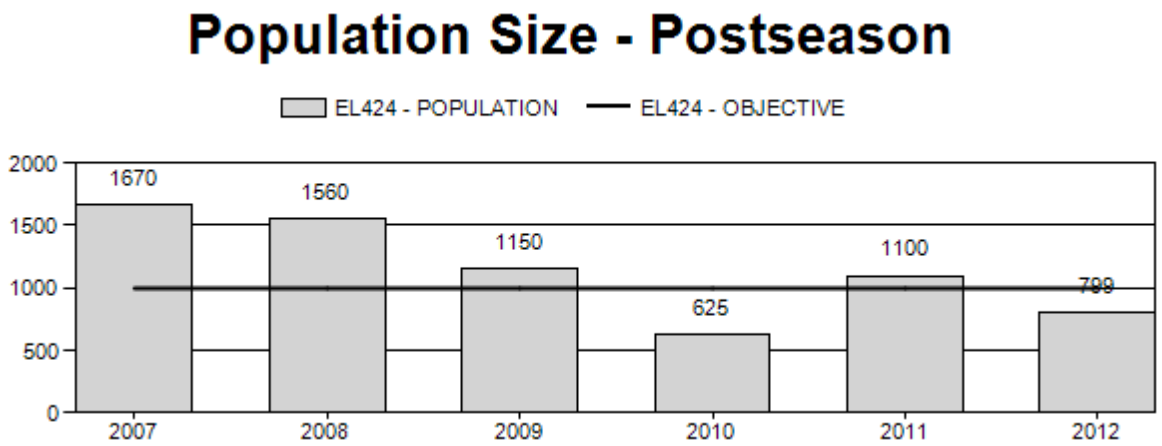
PREPARED BY: PATRICK BURKE

	2007 - 2011 Average	2012	2013 Proposed
Population:	1,221	799	763
Harvest:	473	263	219
Hunters:	669	401	385
Hunter Success:	71%	66%	57 %
Active Licenses:	669	401	385
Active License Percent:	71%	66%	57 %
Recreation Days:	4,893	3,106	2,800
Days Per Animal:	10.3	11.8	12.8
Males per 100 Females	45	20	
Juveniles per 100 Females	44	40	

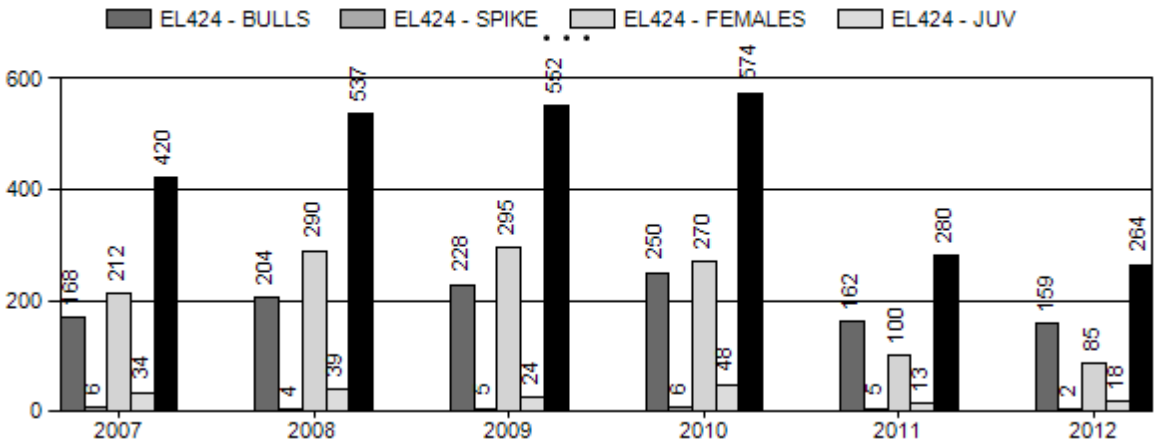
Population Objective:	1,000
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-20.1%
Number of years population has been + or - objective in recent trend:	3
Model Date:	2/21/2013

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

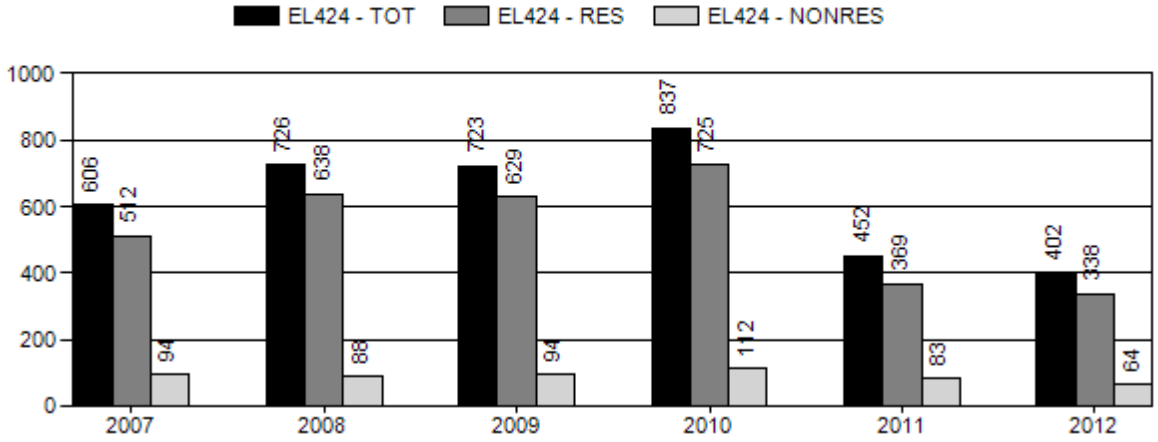
	JCR Year	Proposed
Females ≥ 1 year old:	14.6%	15.2%
Males ≥ 1 year old:	61.7%	79.7%
Juveniles (< 1 year old):	5.1%	6.9%
Total:	22.1%	21.7%
Proposed change in post-season population:	-11.3%	-4.5%



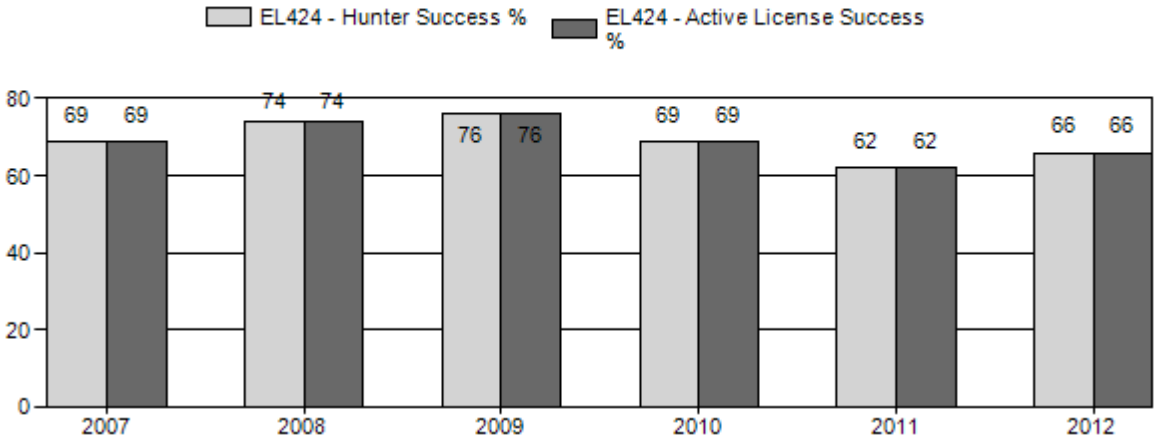
Harvest



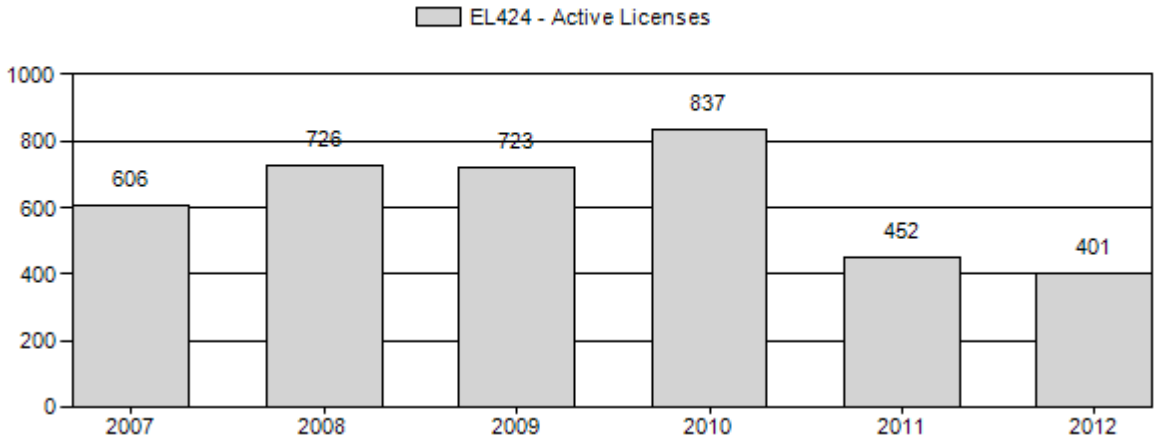
Number of Hunters



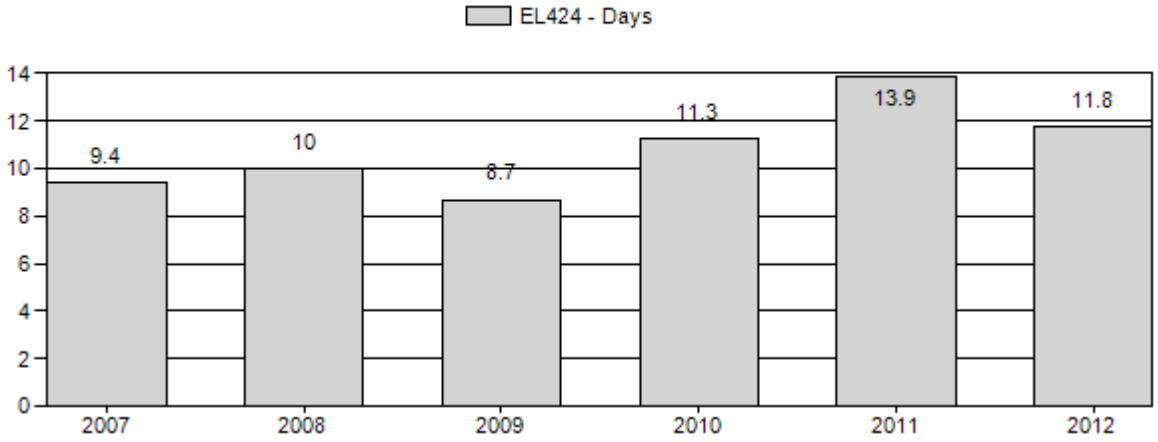
Harvest Success



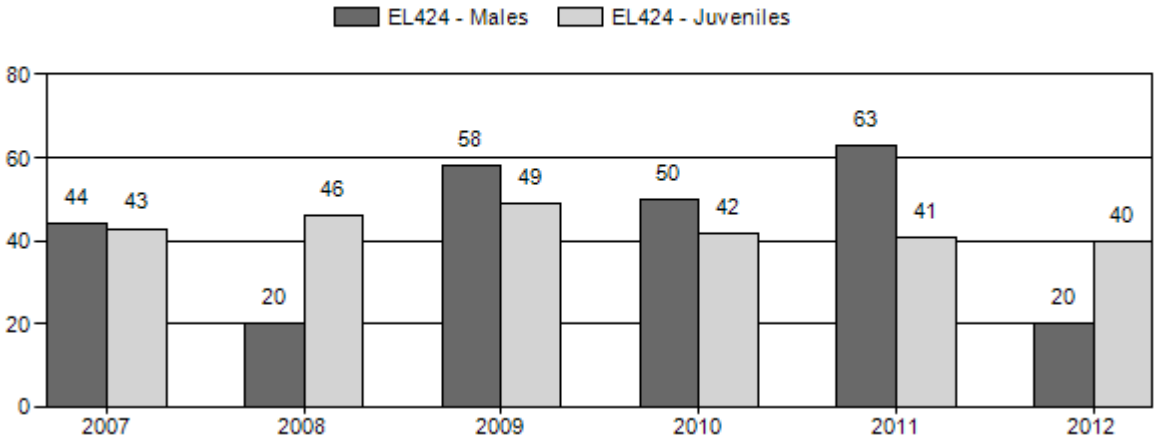
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2007 - 2012 Postseason Classification Summary

for Elk Herd EL424 - SOUTH ROCK SPRINGS

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2007	1,670	67	77	144	24%	327	54%	140	23%	611	536	20	24	44	± 0	43	± 0	30
2008	1,560	22	64	86	12%	423	60%	195	28%	704	526	5	15	20	± 2	46	± 3	38
2009	1,150	81	95	176	28%	306	48%	149	24%	631	529	26	31	58	± 0	49	± 0	31
2010	625	106	156	262	26%	525	52%	222	22%	1,009	379	20	30	50	± 19	42	± 22	28
2011	1,100	60	116	176	31%	280	49%	116	20%	572	485	21	41	63	± 5	41	± 4	25
2012	799	18	7	25	12%	126	62%	51	25%	202	0	14	6	20	± 5	40	± 7	34

2013 HUNTING SEASONS
SOUTH ROCK SPRINGS ELK HERD (EL424)

Hunt Area	Type	SEASON DATES Opens	Closes	Quota	Limitations
30	1	Oct. 1	Oct. 31	30	Limited quota; any elk
30	4	Oct. 1	Oct. 31	30	Limited quota; antlerless elk
31	1	Oct. 1	Oct. 31	75	Limited quota; any elk
31	4	Oct. 1	Oct. 31	75	Limited quota; antlerless elk
32	1	Oct. 1	Oct. 31	75	Limited quota; any elk
32	4	Oct. 1	Oct. 31	75	Limited quota; antlerless elk
32	6	Nov. 9	Nov. 30	25	Limited quota; cow or calf elk
Archery		Sept. 01	Sept. 30		Refer to license type and limitations in Section 3.

Hunt Area	Type	Quota change from 2012
30	1	-10
	4	-10
31	1	-25
	4	
32	1	
	4	
	6	+25
Herd Unit Total	**1**	**-35**
	4	**-10**
	6	**+25**

Management Evaluation

Current Management Objective: 1,000
Management Strategy: Special
2012 Postseason Population Estimate: ~800
2013 Proposed Postseason Population Estimate: ~750

The South Rock Springs elk herd has an objective of 1,000 elk post-season, which was set in 1996, and is designated as a special management herd.

Herd Unit Issues

The 2012 post-season modeled population estimate for this elk herd is about 800 elk with a slightly declining trend. This herd is shared between the states of Wyoming, Colorado, and Utah, with the largest segment of the population probably residing in Colorado. Because of the interstate nature of this population, the number of elk actually residing in Wyoming has been difficult to estimate and probably changes on a day-to-day basis especially during hunting season since significant interchange has been documented between the three states. Also because of the interstate movements of this herd, modeling this herd has been problematic due to the violation the assumption of a closed population. In fact, the management scenario for the last several years has relied on significant immigration of elk into Wyoming from Colorado and Utah in order to support the level of harvest that has been occurring in the Wyoming segment of the population.

Season recommendations for the past several years have been based largely on the assumption that when elk were harvested in Wyoming other elk would move in from either Colorado or Utah to replace them. In order to learn more about the amount of interchange between the three states that this herd occupies the states of Colorado and Utah have placed GPS collars on cow elk in their portions of this herd. Colorado deployed collars in the 2011-2012 winter and Utah just recently put out collars during the 2012-2013 winter. While it is still early in both studies, preliminary results have only documented four out of the 15 Colorado collars moving less than two miles into Wyoming south of Pine Mountain. No movements further into Wyoming have yet been documented.

Weather

The summer of 2012 was extremely dry with little summer precipitation. This lack of moisture was especially evident in areas of the herd unit below 8,000 ft, while the higher elevation parturition areas for the herd unit received enough snow and summer precipitation to allow for some plant growth. The drought conditions at the lower elevation winter ranges of the herd unit will probably affect this herd to some extent most likely in the form of causing elk to winter at higher elevations than normal which may result in more use of already stressed summer parturition ranges that are used by this herd and the South Rock Springs Mule Deer Herd.

Habitat

The Green River aquatic habitat biologist has established six aspen regeneration monitoring transects throughout the South Rock Springs Mule Deer Herd unit. These transects are designed to evaluate browsing impacts from ungulates, primarily elk on young aspen. Two transects were established on Little Mountain in 2007 as well as four additional transects that were established in 2009, one each on Aspen and Miller Mountains and two in the Pine Mountain area. These transects were read each summer since their establishment..

A detailed accounting of the technique and results from these monitoring efforts can be found in the aquatic habitat annual report. In general, this method compares the height of the initial growth point for the current year's terminal leader to the height of the tallest previous terminal leader branch that was killed as a result of browsing. A positive Live-Dead (LD) value suggests growth of young trees, while a negative value or value near zero suggests that browsing may be suppressing tree growth. Results of monitoring efforts are presented in the following table (Table 1) taken from the aquatic habitat annual progress report, but in general, four of the six sites showed negative LD values for 2012, which can most likely be attributed to decreased moisture during 2012 compared to previous years.

Table 1. Trends in aspen regeneration LD Index values (vertical inches) for SRS herd unit 2009-2012

Monitoring site	2009	2010	2011	2012
Pine Mt/Red Ck.	-4.1	-2.4	-0.5	-3.0
South Pine Mt.	+1.9	0	+0.7	-3.2
Miller Mt.	-1.6	+7.4	+8.7	+5.3
Aspen Mt.	-1.8	-1.2	+1.5	-6.0
Little Mt./Dipping Spr.	-15.2	-4.8	-4.1	-2.6
Little Mt./West Currant Ck.	NA	-17.6	+4.2	0

Field Data

This herd was classified from the ground during November and December 2012. The total number of elk classified for the herd unit was 202 elk. The resulting ratios from the ground classification effort were an observed ratio of 40 calves per 100 cows as well as 25 total bulls which included 18 yearling bulls per 100 does. This observed calf ratio is generally in line with average ratios for this population. These ratios were based largely off of only one group of elk due to difficulties with locating elk from the ground and should be viewed with caution.

Harvest Data

While it is difficult to estimate the number of elk currently residing in Wyoming since attempting to quantify the level of immigration of elk possibly moving into Wyoming is currently not possible. After several years of increased harvest in the South Rock Springs herd unit observations by both field personnel and especially the public suggest that there are fewer elk residing in Wyoming than there were a few years ago. This has also been evidenced by reduced hunter success and increasing days per animal for all license types, but especially for the Type 4 licenses in the herd unit. The Type 4 success rate for the 2012 season was 44% in Hunt Area 30, 60% in Hunt Area 31 and 46% in Hunt Area 32. While success rates have always been variable in Hunt Area 32 due to the state line and the ability for elk to easily move into Colorado or Utah to escape hunter pressure, the success rates in Hunt Areas 30 and 31 have traditionally been much higher. This declining success rate along with increasing days per harvest and hunter concerns indicate that elk are less abundant in the herd unit.

Because the special management status and the local importance of the South Rock Springs elk herd, successful Type 1 license holders are asked to voluntarily submit tooth samples of harvested elk for cementum annuli analysis. In 2012, Tooth samples were received from 67 harvested bull elk from the South Rock Springs herd unit. Based on these submitted teeth, the average age of harvested bulls in 2012 was 5.7 years old. This compares to an average of 6.1 years old in 2011, 5.5 years old in 2010, and 5.7 years old in 2009. Five 7.5 year-old bulls were harvested and aged from the herd unit in 2012. In past years, the oldest age class of bull harvested was 11.5 in 2011, 12.5 years old in 2010 and 10.5-years-old in 2009. The reduction in the number of older aged bulls may also suggest a smaller elk population than what was available to hunters in past years.

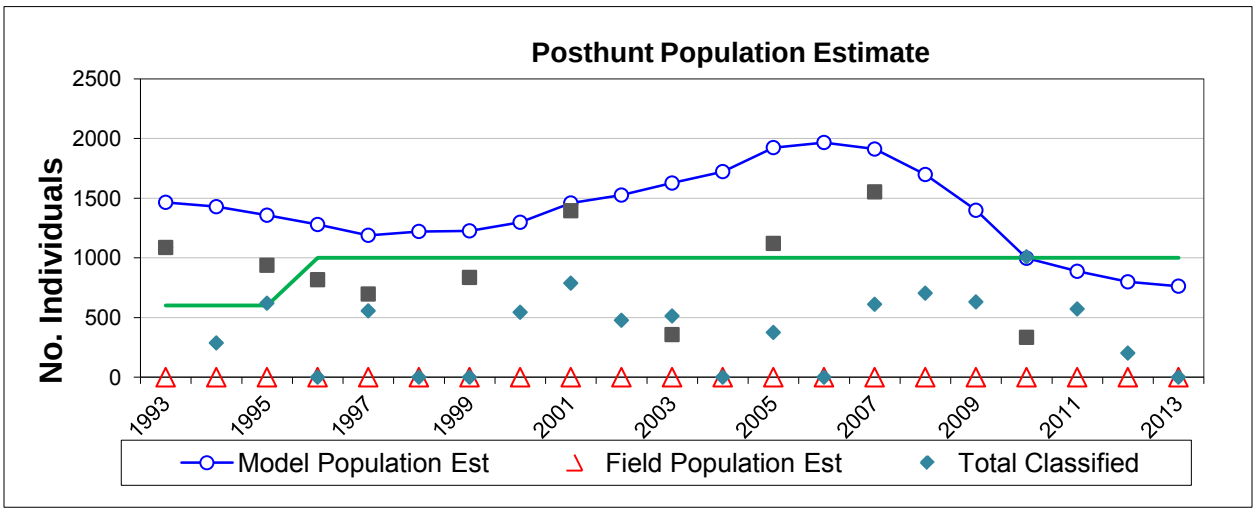
Population

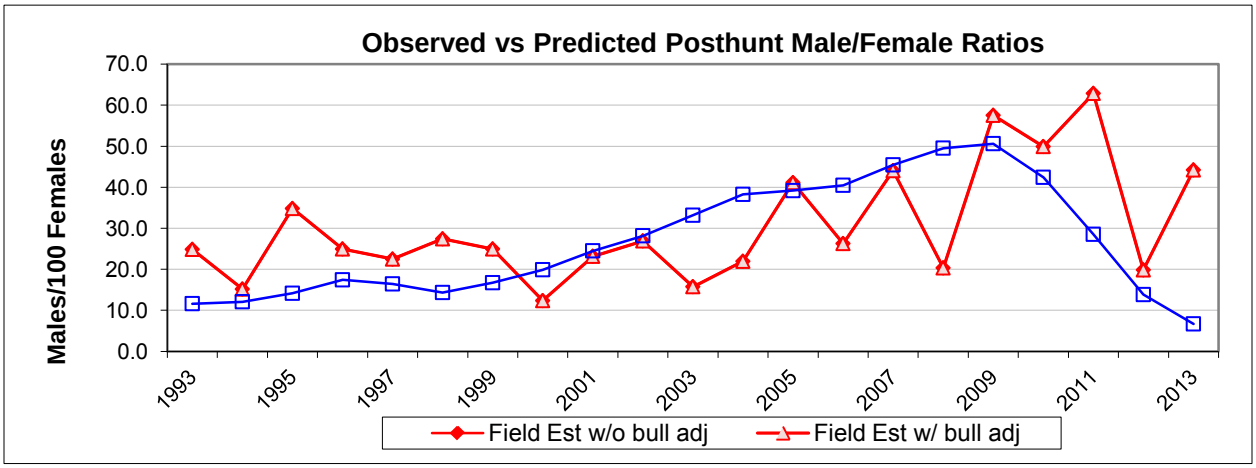
The model for this herd tracks only moderately well at best with observed data mostly due to the inconsistent nature and difficulty in data collection for this herd. The model for this herd does a poor job of matching the bull ratios that are observed in this herd. This may suggest that bulls are emigrating out of Colorado into Wyoming, but this is only speculation. The time-specific juvenile survival model was selected for this herd based AIC values and the general trend provided by that model is the most consistent with field observations.

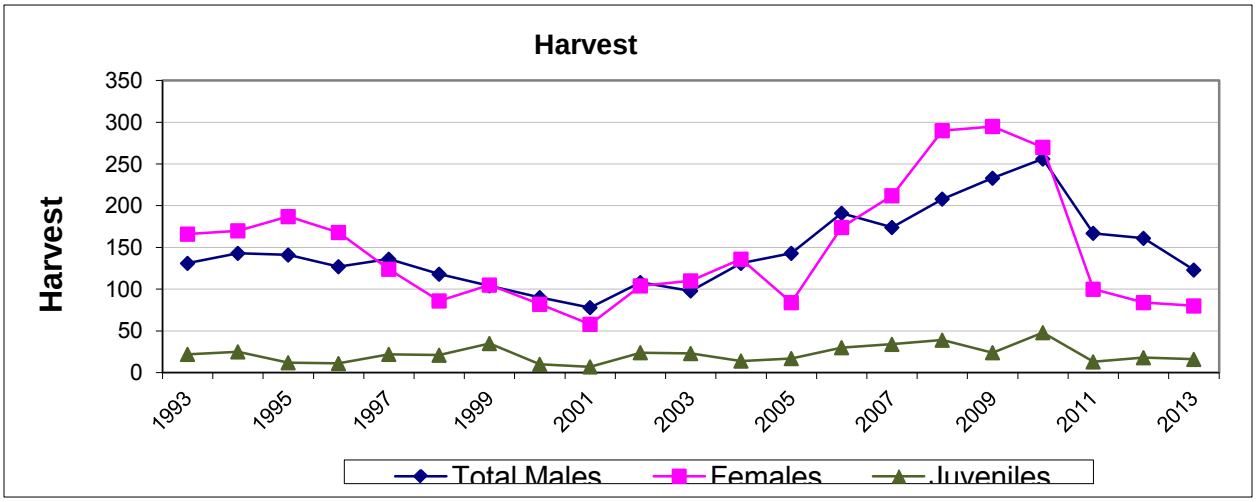
Management Summary

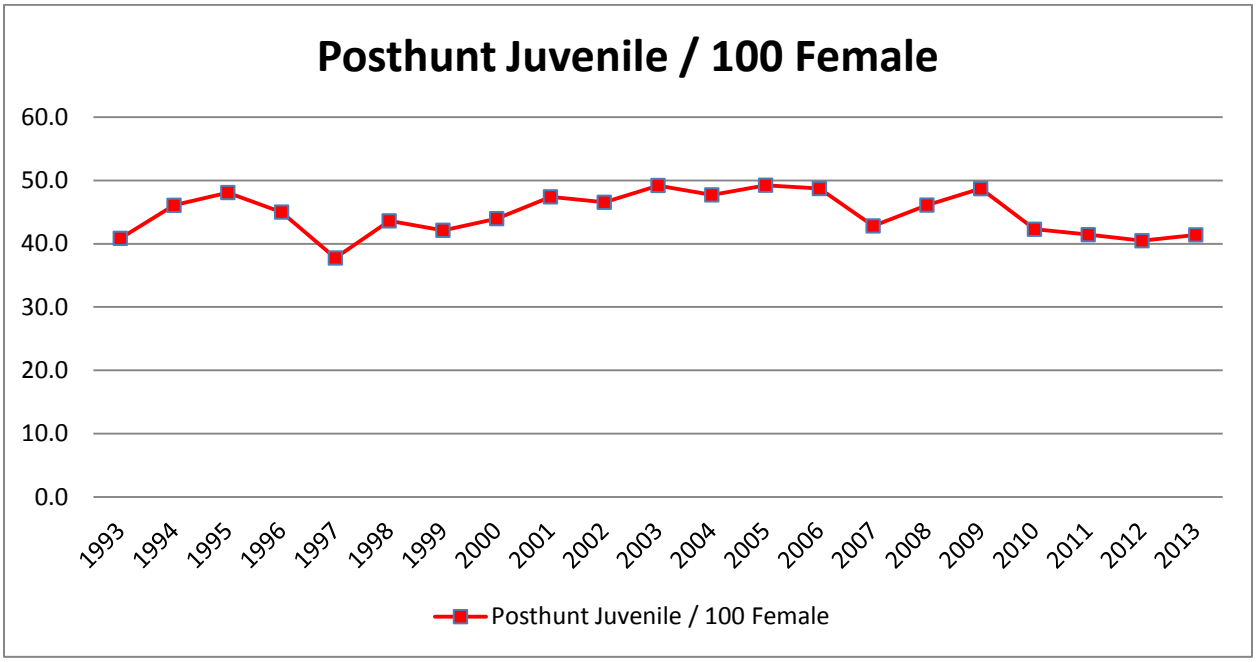
The 2013 season proposal is generally similar to the 2012 season structure with a few proposed changes. The first proposed change is make all Type 1 and Type 4 licenses open on October 1 and end on October 14. This change is being suggested to reduce hunter crowding and hopefully reduce hunter complaints during the second half of October, when the South Rock Springs deer season is taking place. This change also moves the start date for the Type 4 licenses up by six days. While this change may increase competition between bull and cow hunters, especially in Hunt Area 32, it was felt that this change was necessary to give Type 4 license holders an adequate amount of time to harvest an animal with the earlier season ending date. The second major change is the addition of a Type 6 license in Hunt Area 32. This license type is being

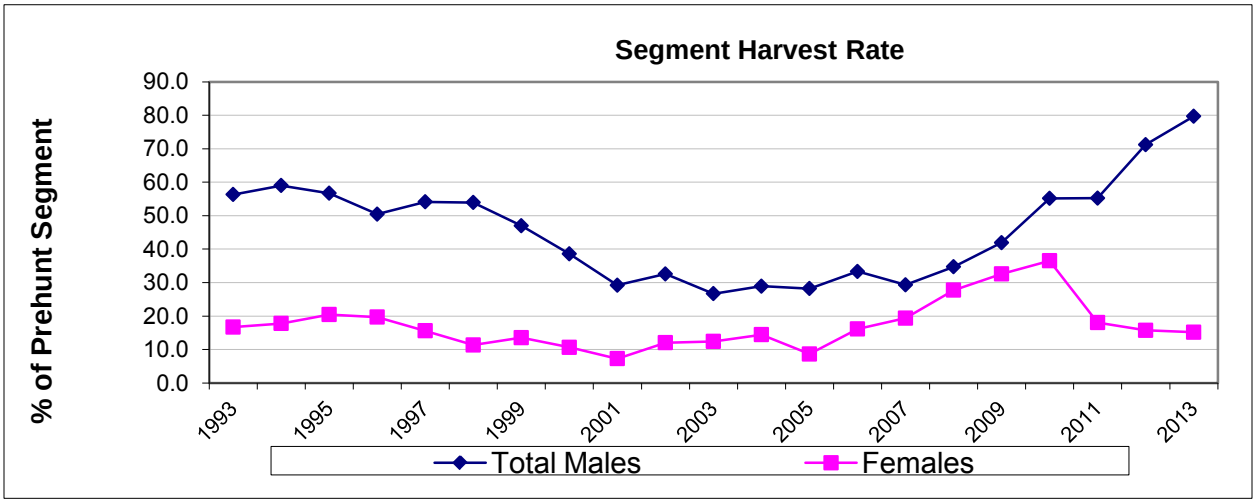
suggested to help facilitate female elk harvest in the southern portion of the hunt area and to place hunters in the field when Colorado is conducting their late season cow hunts. License number reductions are also being proposed in Hunt Areas 30 and 31 in response to increasing days per animal harvested and hunter complaints in those areas.

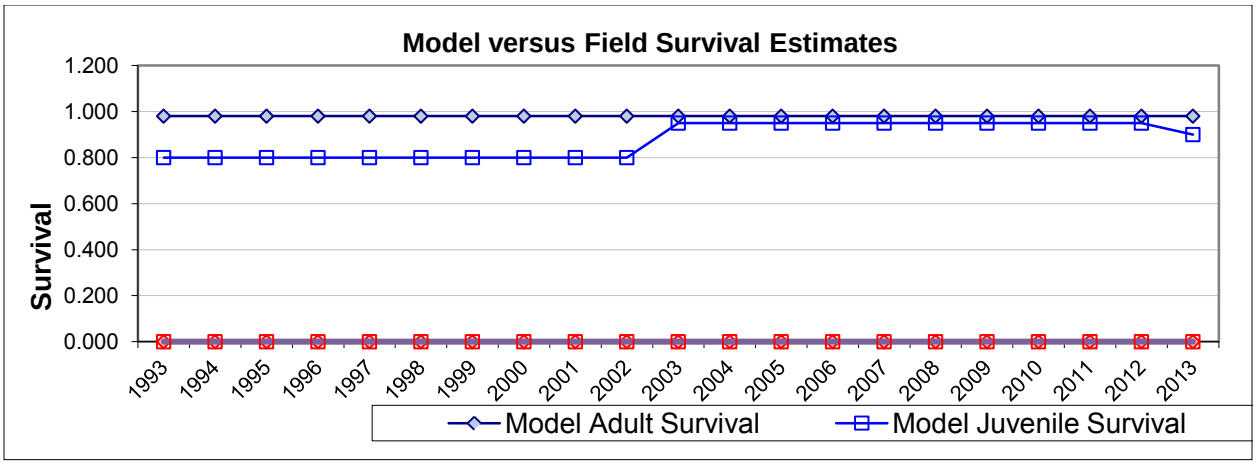

Posthunt Population Estimate
No. Individuals
2500
2000
1500
1000
500
0
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
Model Population Est
Field Population Est
Total Classified

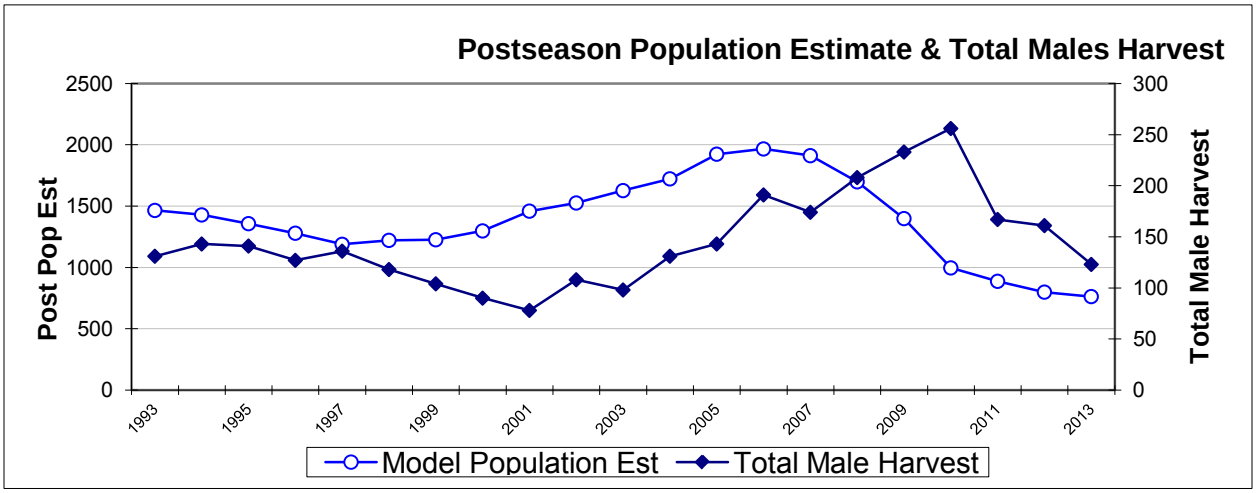

Observed vs Predicted Posthunt Male/Female Ratios
Males/100 Females
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
Field Est w/o bull adj
Field Est w/ bull adj


Harvest
Harvest
350
300
250
200
150
100
50
0
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
Total Males
Females
Juveniles


Posthunt Juvenile / 100 Female
60.0
50.0
40.0
30.0
20.0
10.0
0.0
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Posthunt Juvenile / 100 Female


Segment Harvest Rate
% of Prehunt Segment
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
Total Males
Females


Model versus Field Survival Estimates
Survival
1.200
1.000
0.800
0.600
0.400
0.200
0.000
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Model Adult Survival
Model Juvenile Survival


Postseason Population Estimate & Total Males Harvest
Post Pop Est
Total Male Harvest
2500
2000
1500
1000
500
0
300
250
200
150
100
50
0
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
Model Population Est
Total Male Harvest

INPUT	
Species:	Elk
Biologist:	Patrick Burke
Herd Unit & No.:	SRS EL424
Model date:	02/21/13

Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report
CJ,CA	Constant Juvenile & Adult Survival	510	519	CJ,CA Model
SCJ,SCA	Semi-Constant Juvenile & Semi-Constant Adult Survival	16472	16481	SCJ,SCA Model
TSJ,CA	Time-Specific Juvenile & Constant Adult Survival	407	505	☑ TSJ,CA Model
TSJ,CA,MSC	Time-Specific Juv, Constant Adult Survival, Male survival coefficient	25702	25809	TSJ,CA,MSC Model

Population Estimates from Top Model

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population			Total	Predicted Posthunt Population			Total	Objective
	Field Est	Field SE		Juveniles	Total Males	Females		Juveniles	Total Males	Females		
1993			1087	417	256	1144	1816	393	112	961	1465	600
1994				444	267	1099	1809	416	109	903	1429	600
1995			938	416	274	1052	1741	402	118	837	1357	600
1996			817	367	277	981	1625	354	137	788	1280	1000
1997			697	315	276	914	1505	291	127	771	1189	1000
1998				360	241	872	1473	337	111	773	1221	1000
1999			836	364	244	893	1500	325	129	772	1226	1000
2000				359	257	887	1503	348	158	792	1298	1000
2001			1395	410	294	916	1620	402	208	849	1460	1000
2002				433	365	993	1791	407	246	874	1526	1000
2003			357	464	404	1019	1887	439	296	892	1627	1000
2004				457	499	1083	2039	442	354	926	1723	1000
2005			1121	522	557	1118	2197	503	400	1021	1924	1000
2006				539	631	1240	2410	506	421	1040	1967	1000
2007			1553	472	653	1259	2384	435	462	1016	1912	1000
2008				443	659	1202	2304	400	430	868	1699	1000
2009				368	612	1041	2021	342	355	702	1399	1000
2010			334	281	510	850	1642	228	229	540	997	1000
2011				231	333	637	1200	216	149	522	887	1000
2012				229	249	614	1093	210	72	518	799	1000
2013				231	170	607	1008	213	34	515	763	1000
2014												
2015												
2016												
2017												
2018												
2019												
2020												
2021												
2022												
2023												
2024												
2025												

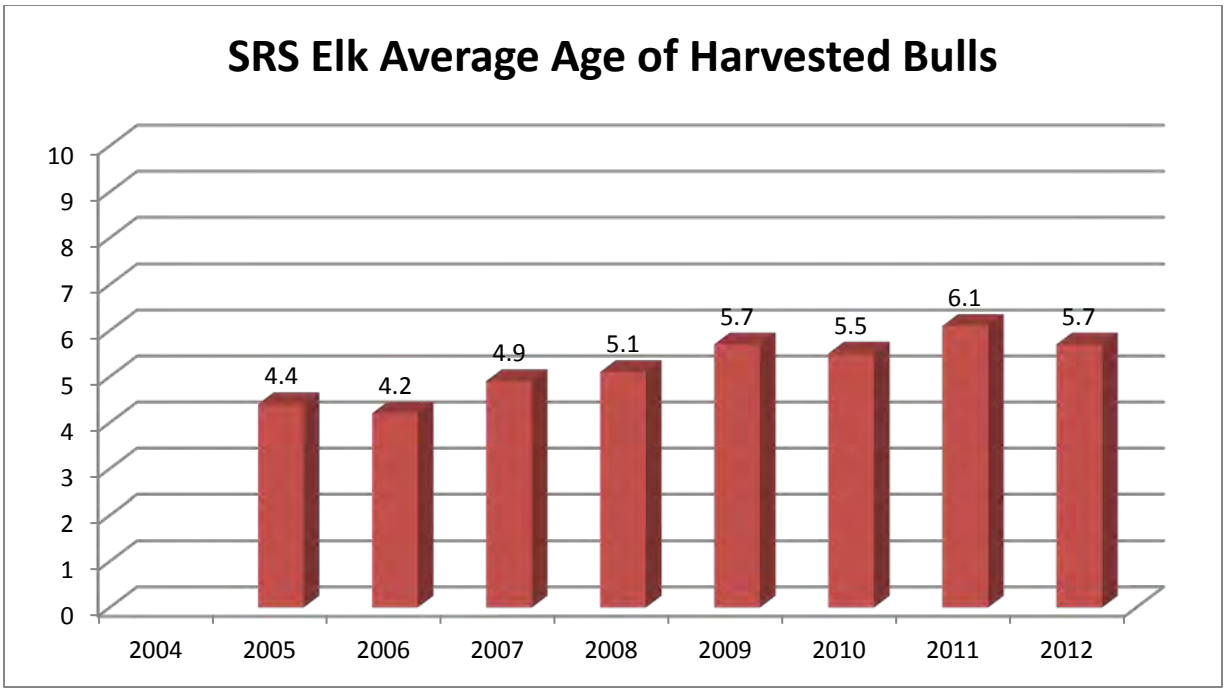
Survival and Initial Population Estimates

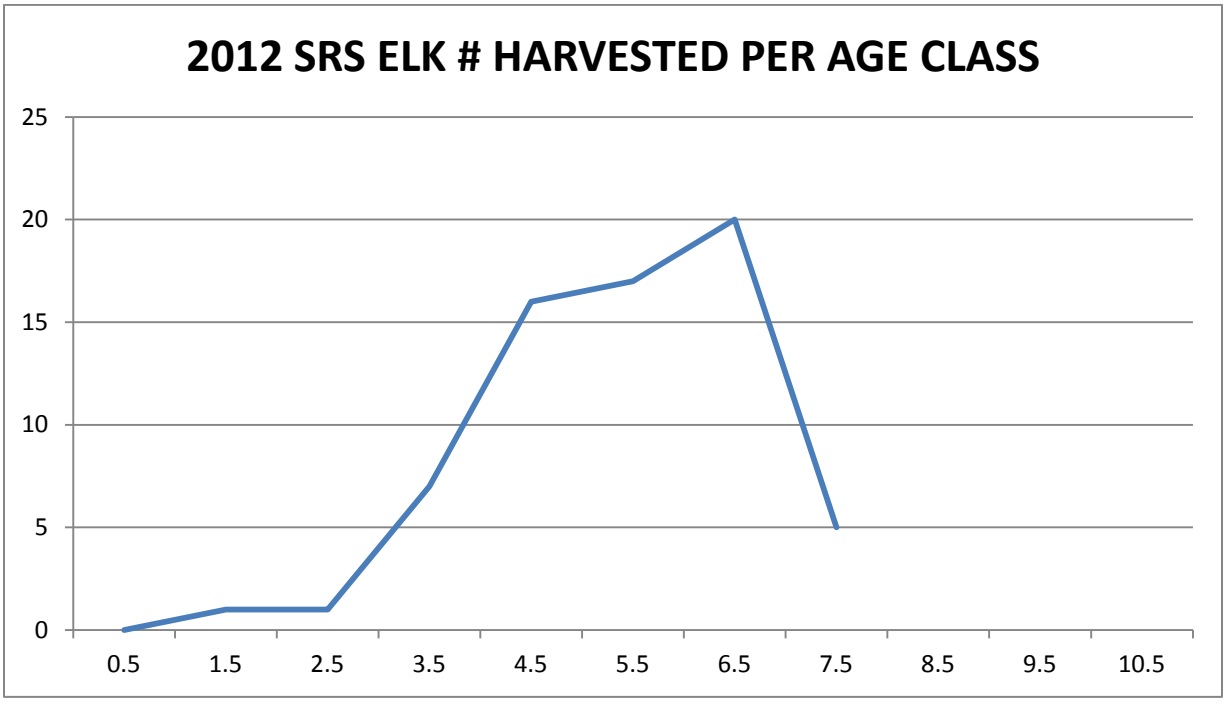
Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1993	0.80			0.98		
1994	0.80			0.98		
1995	0.80			0.98		
1996	0.80			0.98		
1997	0.80			0.98		
1998	0.80			0.98		
1999	0.80			0.98		
2000	0.80			0.98		
2001	0.80			0.98		
2002	0.80			0.98		
2003	0.95			0.98		
2004	0.95			0.98		
2005	0.95			0.98		
2006	0.95			0.98		
2007	0.95			0.98		
2008	0.95			0.98		
2009	0.95			0.98		
2010	0.95			0.98		
2011	0.95			0.98		
2012	0.95			0.98		
2013	0.90			0.98		
2014						
2015						
2016						
2017						
2018						
2019						
2020						
2021						
2022						
2023						
2024						
2025						

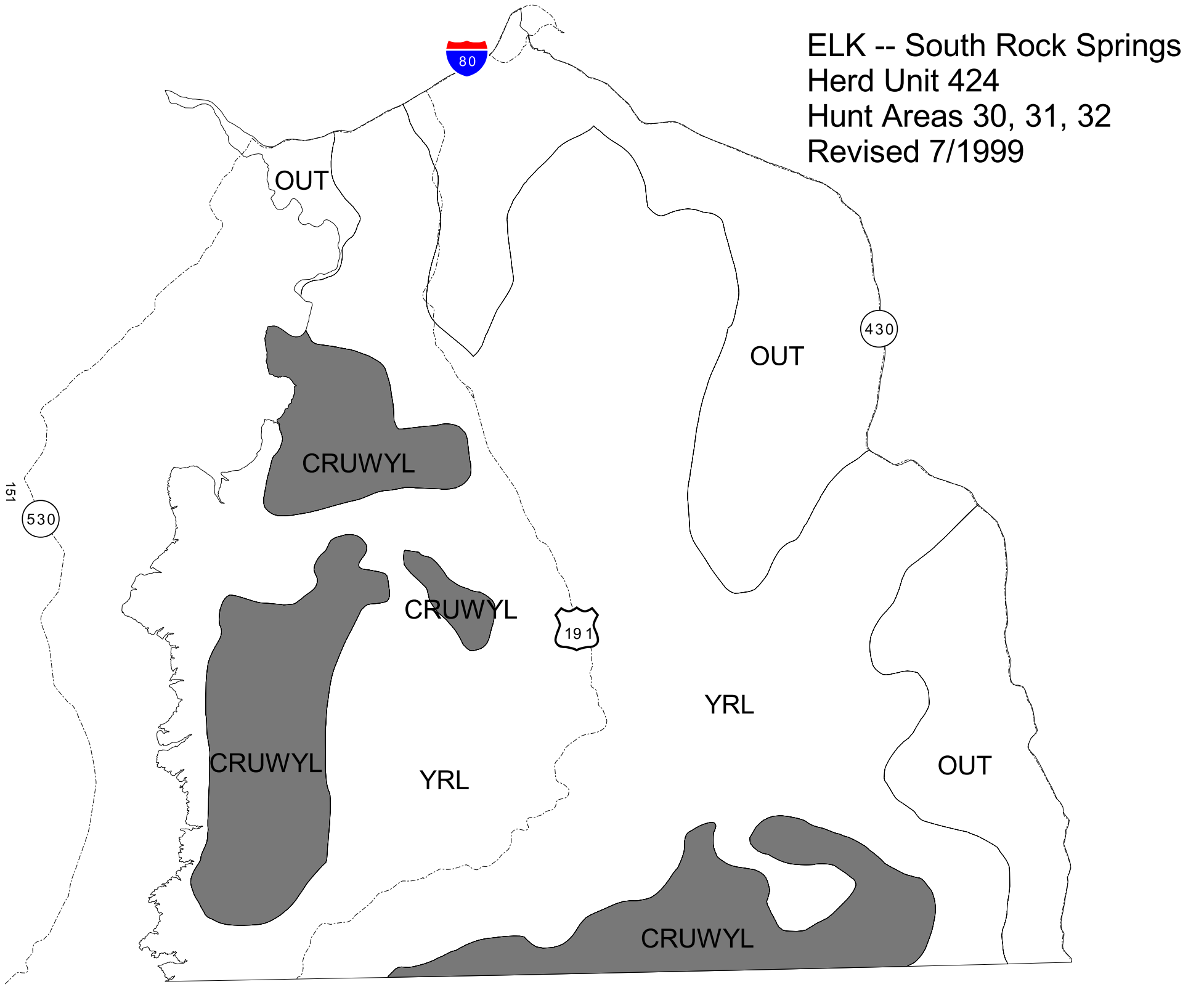
Parameters:	Optim cells
Adult Survival =	0.980
Initial Total Male Pop/10,000 =	0.011
Initial Female Pop/10,000 =	0.096

MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	15%
Wounding Loss (juveniles) =	10%
Total Bulls Adjustment Factor	100%

Classification Counts								Harvest				
Year	Juvenile/Female Ratio			Total Male/Female Ratio								
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/ bull adj	Field Est w/o bull adj	Field SE	Juv	Yrl males	2+ Males	Females	Total Harvest
1993		40.85	2.96	11.63	24.85	24.85	2.17	22	24	107	166	319
1994		46.07	6.15	12.09	15.17	15.17	3.13	25	14	129	170	338
1995		48.08	4.58	14.15	34.81	34.81	3.72	12	16	125	187	340
1996		45.00	4.56	17.43	24.94	24.94	3.01	11	8	119	168	306
1997		37.75	3.87	16.43	22.48	22.48	2.82	22	18	118	124	282
1998		43.61	4.34	14.34	27.41	27.41	3.18	21	9	109	86	225
1999		42.12	4.26	16.73	24.94	24.94	3.00	35	11	93	105	244
2000		43.97	4.26	19.89	12.36	12.36	2.00	10	5	85	82	182
2001		47.40	3.89	24.50	23.16	23.16	2.48	7	0	78	58	143
2002		46.55	4.98	28.17	26.91	26.91	3.52	24	4	104	104	236
2003		49.20	4.86	33.17	15.76	15.76	2.42	23	1	97	110	231
2004		47.71	4.58	38.26	21.94	21.94	2.81	14	2	129	136	281
2005		49.24	6.11	39.17	41.12	41.12	5.43	17	5	138	84	244
2006		48.72	5.18	40.47	26.27	26.27	3.55	30	0	191	174	395
2007		42.81	4.32	45.44	44.04	44.04	4.40	34	6	168	212	420
2008		46.10	3.99	49.52	20.33	20.33	2.40	39	4	204	290	537
2009		48.69	4.86	50.62	57.52	57.52	5.44	24	5	228	295	552
2010		42.29	3.39	42.41	49.90	49.90	3.77	48	6	250	270	574
2011		41.43	4.57	28.53	62.86	62.86	6.05	13	5	162	100	280
2012		40.48	6.72	13.83	19.84	19.84	4.34	18	2	159	84	263
2013		41.40	4.89	6.69	44.20	44.20	4.72	16	1	122	80	219
2014												
2015												
2016												
2017												
2018												
2019												
2020												
2021												
2022												
2023												
2024												
2025												


SRS Elk Average Age of Harvested Bulls
10
9
8
7
6
5
4
3
2
1
0
4.4
4.2
4.9
5.1
5.7
5.5
6.1
5.7
2004
2005
2006
2007
2008
2009
2010
2011
2012


2012 SRS ELK # HARVESTED PER AGE CLASS
25
20
15
10
5
0
0.5
1.5
2.5
3.5
4.5
5.5
6.5
7.5
8.5
9.5
10.5


ELK -- South Rock Springs
Herd Unit 424
Hunt Areas 30, 31, 32
Revised 7/1999
80
OUT
OUT
430
CRUWYL
151
530
CRUWYL
191
YRL
CRUWYL
YRL
OUT
CRUWYL

2012 - JCR Evaluation Form

SPECIES: Elk | PERIOD: 6/1/2012 - 5/31/2013

HERD: EL425 - SIERRA MADRE

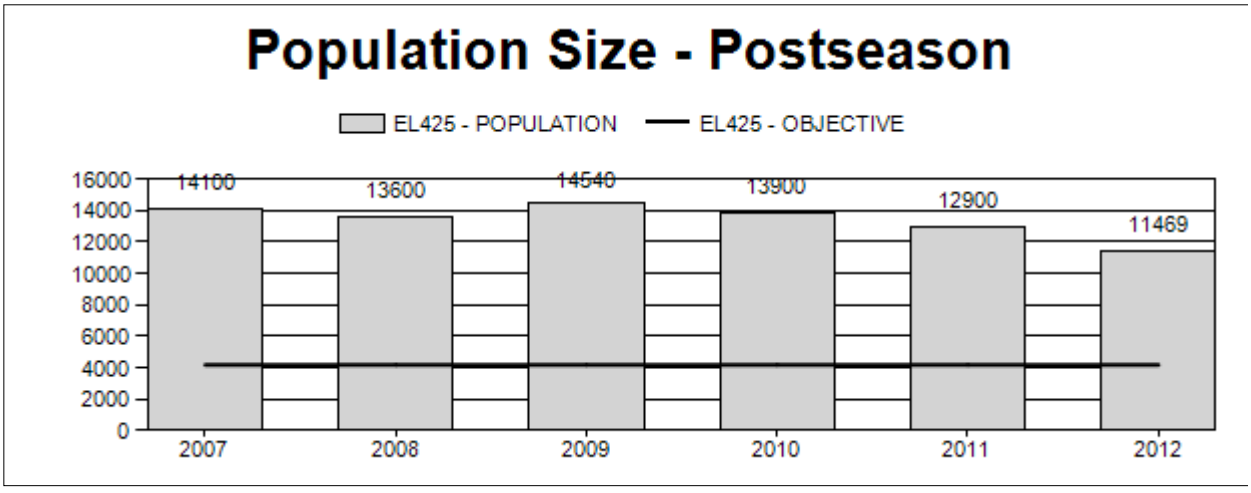
HUNT AREAS: 13, 15, 21, 108, 130 | PREPARED BY: TONY MONG

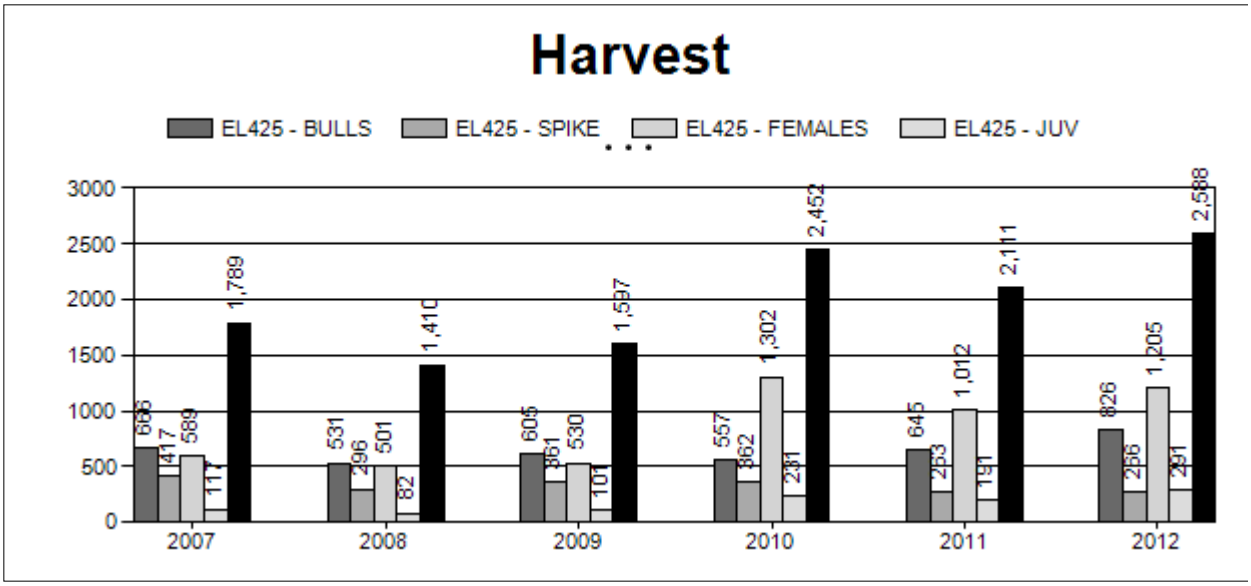
	2007 - 2011 Average	2012	2013 Proposed
Population:	13,808	11,469	10,742
Harvest:	1,872	2,588	2,400
Hunters:	4,892	5,983	5,800
Hunter Success:	38%	43%	41%
Active Licenses:	5,020	6,226	6,300
Active License Percent:	37%	42%	38%
Recreation Days:	31,502	38,331	38,800
Days Per Animal:	16.8	14.8	16.2
Males per 100 Females	24	29	
Juveniles per 100 Females	36	38	

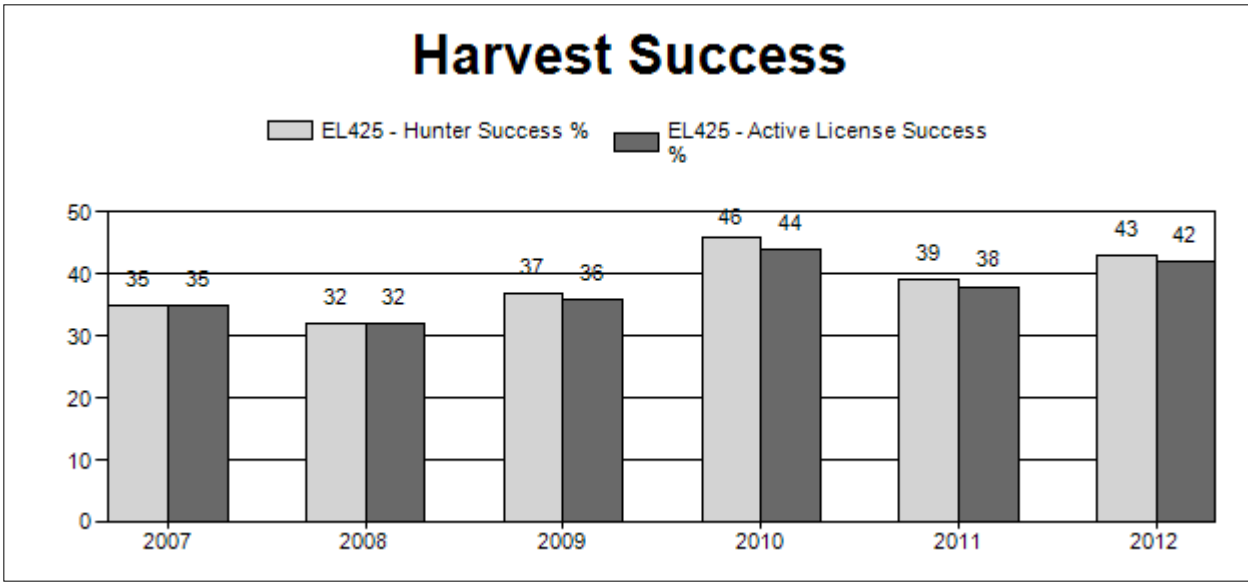
Population Objective:	4,200
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	173%
Number of years population has been + or - objective in recent trend:	10
Model Date:	05/28/2013

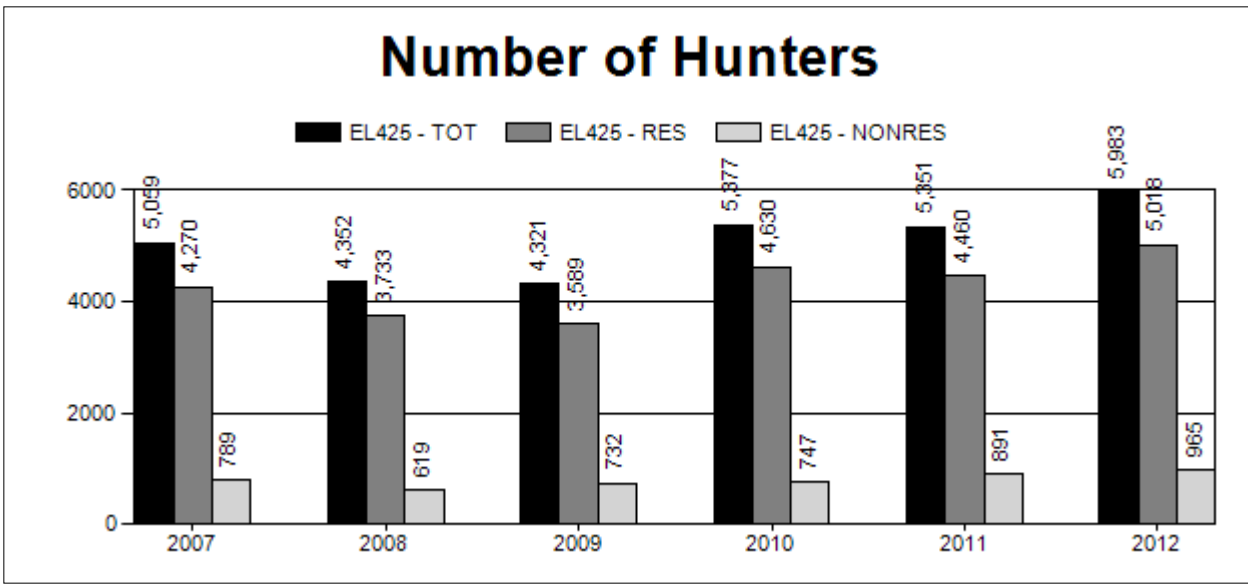
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

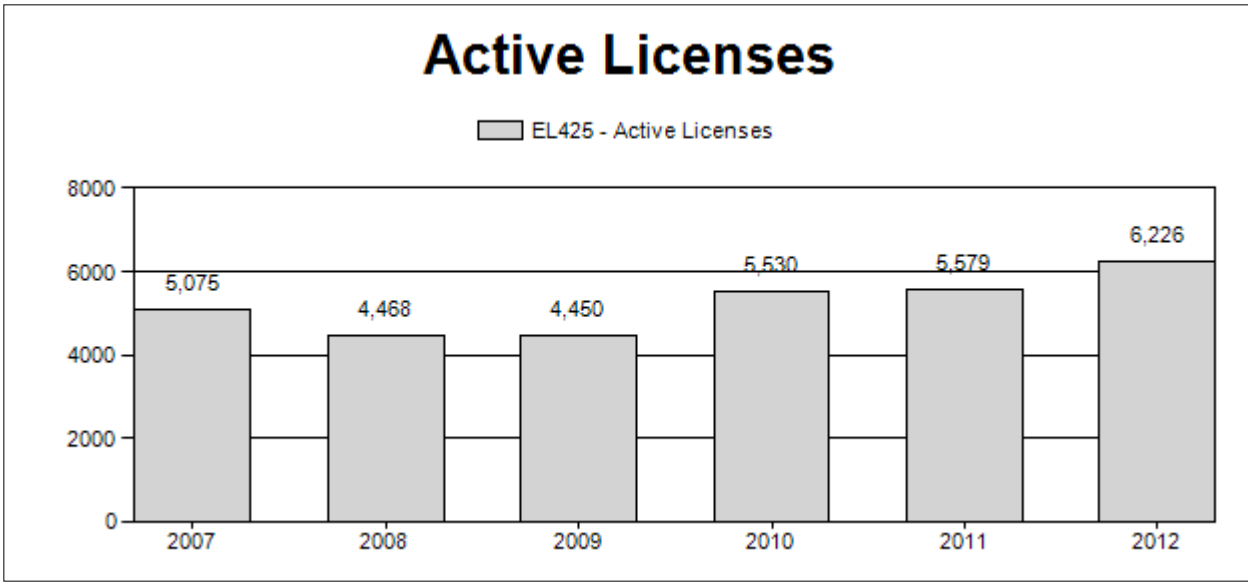
	JCR Year	Proposed
Females ≥ 1 year old:	20.0%	18%
Males ≥ 1 year old:	35.1%	31%
Juveniles (< 1 year old):	9.0%	7%
Total:	22.0%	20%
Proposed change in post-season population:	10.0%	10%

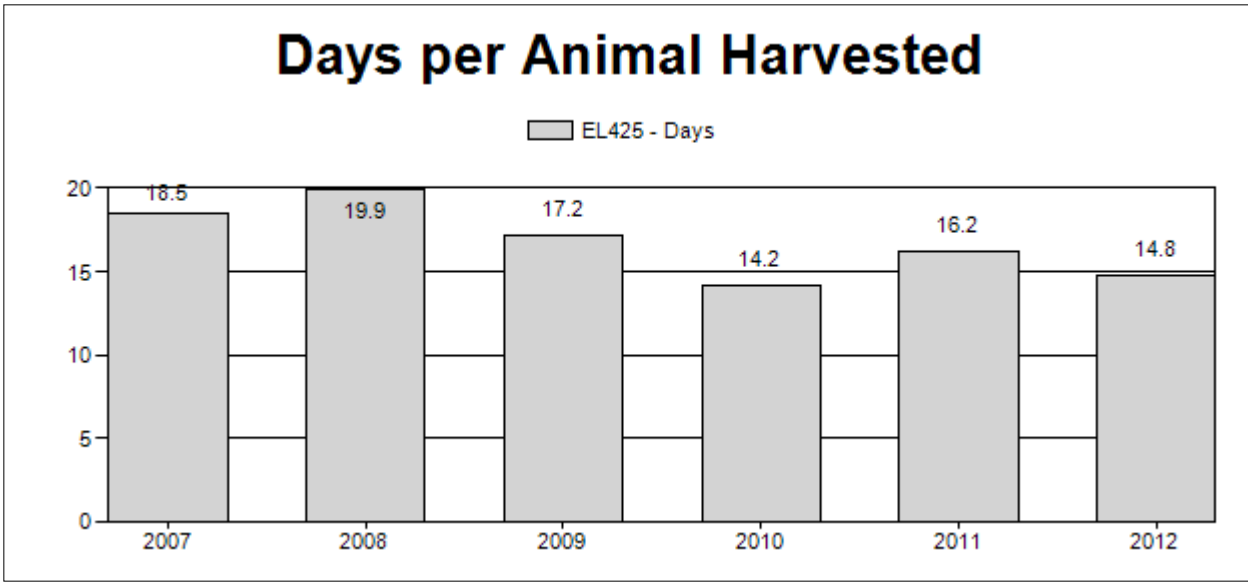


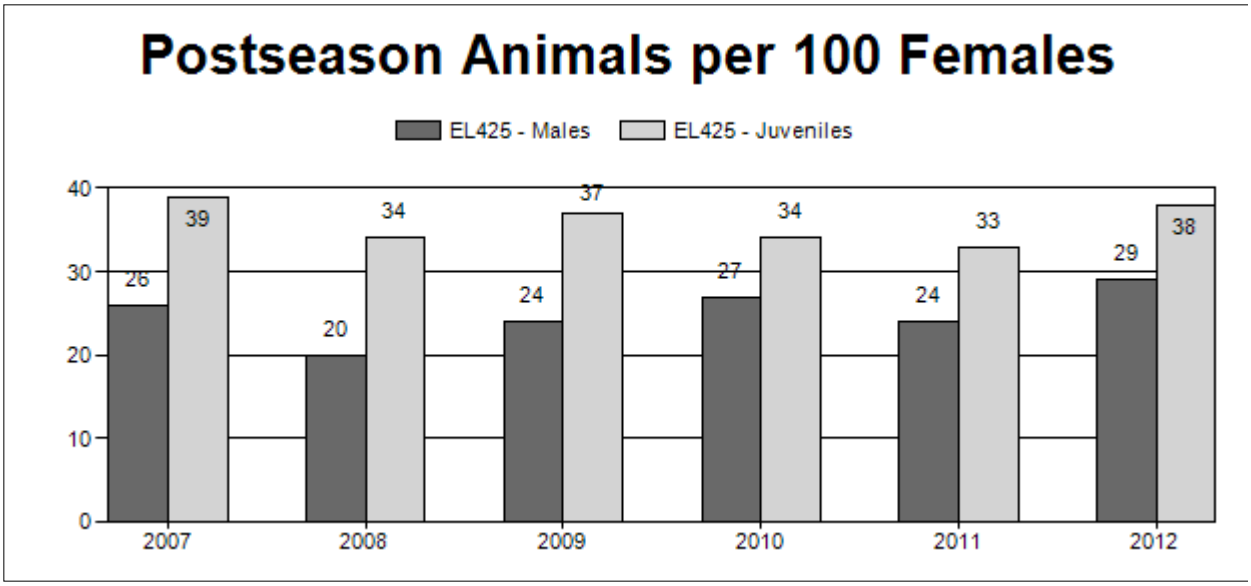

Harvest
EL425 - BULLS
EL425 - SPIKE
EL425 - FEMALES
EL425 - JUV
3000
2500
2000
1500
1000
500
0
2007
2008
2009
2010
2011
2012
606
417
589
117
1,789
531
296
501
82
1,410
605
361
530
101
1,597
557
362
1,302
281
2,452
645
253
1,012
191
2,111
826
256
1,205
291
2,588


Harvest Success
EL425 - Hunter Success %
EL425 - Active License Success %
50
40
30
20
10
0
2007
2008
2009
2010
2011
2012
35
35
32
32
37
36
46
44
39
38
43
42


Number of Hunters
EL425 - TOT
EL425 - RES
EL425 - NONRES
6000
4000
2000
0
2007
2008
2009
2010
2011
2012
5,059
4,270
789
4,352
3,733
619
4,321
3,589
732
5,377
4,630
747
5,351
4,460
891
5,983
5,018
965


Active Licenses
EL425 - Active Licenses
8000
6000
4000
2000
0
5,075
4,468
4,450
5,530
5,579
6,226
2007
2008
2009
2010
2011
2012


Days per Animal Harvested
EL425 - Days
20
15
10
5
0
18.5
19.9
17.2
14.2
16.2
14.8
2007
2008
2009
2010
2011
2012


Postseason Animals per 100 Females
EL425 - Males
EL425 - Juveniles
40
30
20
10
0
26
39
20
34
24
37
27
34
24
33
29
38
2007
2008
2009
2010
2011
2012

2013 HUNTING SEASONS

SPECIES : **Elk**

HERD UNIT : **Sierra Madre (425)**
HUNT AREAS: **13, 15, 21, 108, 130**

Hunt Area	Type	Open	Close	Quota	Limitations
13		Oct. 15	Oct. 31		General license; any elk
	6	Oct. 1	Nov. 14	100	Limited quota; cow or calf
15		Oct. 15	Oct. 31		General license; any elk
	6	Oct. 1	Nov. 14	150	Limited quota; cow or calf
21		Oct. 10	Oct. 14		General youth license; antlerless elk
		Oct. 15	Oct. 24		General license; any elk
		Oct. 25	Nov. 30		General license; antlerless elk
	6	Oct. 15	Nov. 30	450	Limited quota; cow or calf
		Dec. 1	Jan. 31		Unused Area 21 Type 6 licenses valid for cow or calf elk in Area 108
	7	Aug. 15	Dec. 31	125	Limited quota; cow or calf valid on private land
108	1	Oct. 11 – 10/31	Oct. 31	75	Limited quota; any elk
	4	Oct. 11	Nov. 30	100	Limited quota; antlerless elk
	6	Oct. 11	Nov. 30	100	Limited quota; cow or calf
	7	Dec. 1	Jan. 31	500	Limited quota; cow or calf
		Dec. 1	Jan. 31		Unused Area 108 Type1, Type 4 and Type 6 licenses valid for antlerless elk
130		Oct. 1	Oct. 23		General license; any elk
13, 15, 21, 108, 130	Archery	Sept. 1	Sept. 30		General license; any elk; Limited quota license refer to Section 3

Hunt Area	Type	Quota change from 2012
Total		**None**

Management Evaluation

Current Management Objective: 4,200

Management Strategy: Recreational

2012 Postseason Population Estimate: ~11,000

2013 Proposed Postseason Population Estimate: ~10,000

The Sierra Madre elk herd (SMEH) is above the objective of 4,200 (set in 1978), and our current management strategy is to decrease herd size through a significant amount of antlerless harvest.

Herd Unit Issues

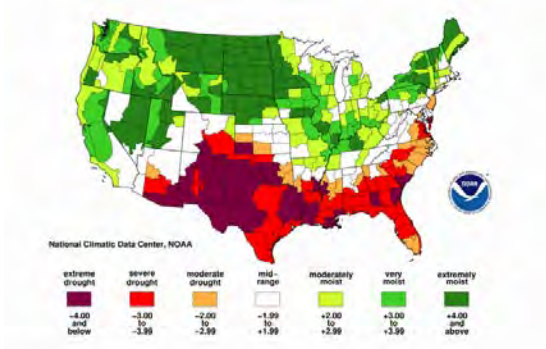
Despite increasing pressure from the Atlantic Rim gas field the SMEH continues to be productive and has not shown negative impacts from the increase in oil and gas development activities in the herd unit. Elk have likely moved in response to development and may be occupying mule deer winter range to a greater degree to increased numbers and movement associated with disturbance. The large Choke Cherry-Sierra Madre wind project may have a larger impact on this elk population because this project may more directly impact both wintering elk and migrating elk. Another landscape wide impact to the SMEH will be the progression of beetle kill through the Sierra Madre range, although this may yield positive effects. Currently trees have begun to fall at alarming rates which may lead to disruption in traditional movement patterns, and will impact the ability of hunters to access portions of the forest.

Weather

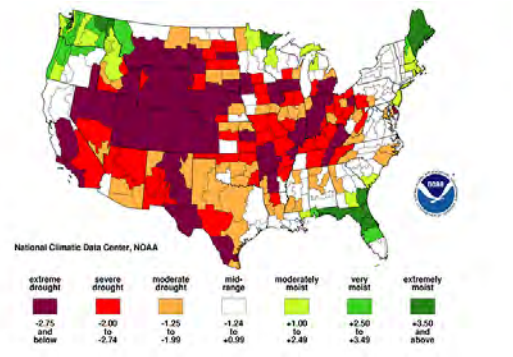
The weather conditions have been quite variable over the last several years. In 2010-11 moisture levels were at record highs with high snow levels and followed in 2011-12 with record drought conditions and low snow levels (Figure 1).

Figure 1. A) Palmer short-term drought index from June 2011. B) Palmer short-term drought index from June 2012

A)



B)



Field Data

The SMEH has traditionally been a very productive herd and until recently has shown constant, steady growth. Although calf ratios have remained relatively modest over the last ten years (40:100 cows) the herd is at a level that makes it difficult to decrease the population. Recently, calf ratios have been as low as 33 calves:100 cows, suggesting the population was approaching carrying capacity. However, the institution of any elk general seasons in 2010 clearly marks the start of a decreasing population trend, moving this population toward objective. Calf ratios will likely increase as overall elk numbers decrease. The drought of 2012 did not seem to have as dramatic effect on elk as was the case with mule deer and pronghorn in this area. Field checked animals seemed to have adequate fat deposits to ensure survival overwinter. If we do see higher calf ratios during the 2012-13 classification survey, higher cow harvest may be needed in 2013 to offset the increased number of animals entering the population. Historically this herd has had low bull ratios and low quality due to heavy hunting pressure on bulls. However, with the recent focus on cow harvest and the any elk seasons it seems we are seeing an increase in bull ratios and possibly an increase in larger bulls. This is most likely a combination of artificial inflation due to higher cow harvest compared to bull harvest and actual increases in the number of bulls that live through the season because many hunters are not waiting to harvest a bull but harvesting a cow instead.

Harvest Data

The SMEH continues to be one of the most heavily hunted and highest harvested herd units in the state. In 2012, elk harvest in the SMEH represented over 10% of the total statewide harvest for elk in the entire state. Over the last 3 years hunters have harvested over 7,000 elk out of the SMEH. The SMEH reached an estimated hunter participation never seen in recent history of just over 6,069. The large number of hunters in 2012 equated to a high harvest success that is nearly double the statewide general harvest success (44% in the SMEH versus 29% statewide) and despite the large number of hunters in the unit, hunters are indicating they are satisfied with their hunt in the SMEH (69.8% satisfied, 1572 hunters surveyed). We can expect both harvest success and hunter satisfaction to decrease as we decrease elk numbers to reach objective.

Population

Currently estimating the SMEH population is somewhat difficult because of inconsistency in two independent population estimates and the spreadsheet model. We have used all available estimates, including that derived from the spreadsheet model, and what is most consistent with personnel observations to determine herd status. The data points used to establish a population

range include the spreadsheet model, sightability survey and a mark-resight estimate based on resighting radio collars during winter flights.

In an effort to refine and enhance the population estimate produced by the spreadsheet model the 2012-2013 classification flights were changed to include more hours of flight and the utilization of the sightability technique (Appendix 1). The current post-hunt population model estimate for the SMEH indicates that elk numbers remain well above the current objective. The TSF, CA, MSC model has the lowest AICc value indicating the best fit model and tracks bull ratios better than other models and was selected for this herd unit. In addition to the standard parameters included in the model, an independent estimate of the population was created from a sightability flight conducted in March 2013 (Appendix 1). The estimate created from the sightability flight had a large amount of variation (7,934, SE = 1,226, range = 2,402). Because of the large amount of variation with this estimate the spreadsheet model responded very little to the inclusion of the population estimate from the sightability survey. However, using a rough estimate of population size based on the number of collars detected on the sightability survey and the number of collars available to be seen (n = 14 seen, n = 25 available to be seen) it appears the spreadsheet model may be overestimating herd size, albeit modestly. We observed a total of 4,150 elk during the aerial survey which may represent about 56% of the total number of elk in the SMEH (based on collars not seen). Using this proportion results in a rough estimate of ~7,450. This information, coupled with field personnel observations, suggests it is highly unlikely that 6,000 to 7,000 elk were missed during the winter survey, inconsistent with model results.

Management Summary

Harvest success, hunter success, model estimates, and the total number of elk classified all suggest this elk population remains above the current objective. Liberal seasons focusing on cow harvest will continue to decrease the SMEH and bring the population closer to the current objective. As stated above cow harvest may need to be increased in 2013 because of potentially higher calf ratios, and both the general antlerless season and Type 6 seasons were extended to the end of November. Because of our objective to reduce elk numbers, and the potential to provide youth a unique experience hunting elk, we are instituting a youth season that will allow youth to harvest cows before the general season. We do not feel this will negatively impact the general season, and may result in a few additional harvested cow elk. Even with the high harvest in the SMEH, the high survival rates of both adult and juvenile elk will negatively affect our direction to reduce this population.

INPUT	
Species:	Elk
Biologist:	Tony Mong
Herd Unit & No.:	EL425 Sierra Madre
Model date:	05/28/13

Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CF,CA	Constant Juvenile & Adult Survival	238	247	CF,CA Model	
SCF,SCA	Semi-Constant Juvenile & Semi-Constant Adult Survival	192	201	SCF,SCA Mo	
TSF,CA	Time-Specific Juvenile & Constant Adult Survival	148	270	TSJ,CA Model	
TSF,CA,MSC	Time-Specific Juv, Constant Adult Survival, Male survival coefficien	43	177	TSJ,CA,MSC Model	

Population Estimates from Top Model

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population				Predicted Posthunt Population				Objective
	Field Est	Field SE		Juveniles	Total Males	Females	Total	Juveniles	Total Males	Females	Total	
1993				2843	1961	6941	11746	2736	1094	6316	10145	4200
1994				3076	2342	7318	12736	2946	1001	6762	10709	4200
1995				3417	1838	7328	12583	3318	939	6784	11042	4200
1996				3284	1890	7461	12635	3174	1391	6800	11365	4200
1997				2937	2278	7432	12647	2830	1113	6705	10648	4200
1998				3048	2313	7641	13002	2978	1414	6863	11255	4200
1999				3165	2518	7710	13393	2932	1358	6830	11121	4200
2000				3020	2408	7622	13050	2846	1371	6593	10810	4200
2001				3018	2496	7472	12985	2844	1202	6636	10682	4200
2002				3225	2496	7674	13396	2971	1381	6628	10980	4200
2003				3219	2727	7728	13674	3070	1496	6861	11427	4200
2004				3176	2761	7873	13810	3095	1390	7268	11754	4200
2005				3663	2728	8329	14719	3512	1631	7545	12688	4200
2006				3487	2744	8380	14611	3275	1665	7627	12567	4200
2007				3279	2992	8674	14944	3147	1830	8022	13000	4200
2008				2849	2688	8589	14127	2759	1779	8038	12576	4200
2009				3251	3006	8970	15227	3140	1943	8387	13470	4200
2010				2942	3105	9246	15293	2684	2121	7857	12662	4200
2011				2687	3109	8575	14371	2477	2110	7462	12049	4200
2012	7900	1225		2920	3187	8288	14395	2596	1952	6920	11469	4200
2013				2747	3093	7828	13668	2424	1858	6461	10742	4200
2014				2552	2922	7308	12782	2229	1687	5941	9856	4200
2015				2557	2276	6330	11163	2447	1588	5670	9705	4200

Survival and Initial Population Estimates

Year	Winter Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1993	0.95			0.95		
1994	0.60			0.95		
1995	0.60			0.95		
1996	0.60			0.95		
1997	0.88			0.95		
1998	0.79			0.95		
1999	0.76			0.95		
2000	0.84			0.95		
2001	0.95			0.95		
2002	0.95			0.95		
2003	0.87			0.95		
2004	0.91			0.95		
2005	0.68			0.95		
2006	0.86			0.95		
2007	0.60			0.95		
2008	0.95			0.95		
2009	0.80			0.95		
2010	0.81			0.95		
2011	0.95			0.95		
2012	0.95			0.95		
2013	0.95			0.95		
2014	0.60			0.95		
2015	0.60			0.95		

Parameters:	Optim cells
Male Survival Coefficient	1.000
Adult Survival =	0.953
Initial Total Male Pop/10,000 =	0.109
Initial Female Pop/10,000 =	0.632

MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%
Total Bulls Adjustment Factor	100%

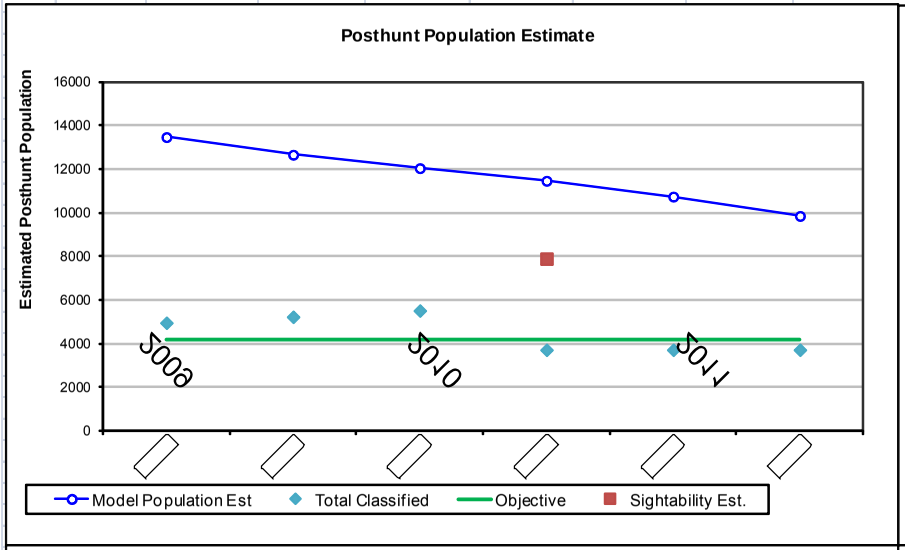
Classification Counts

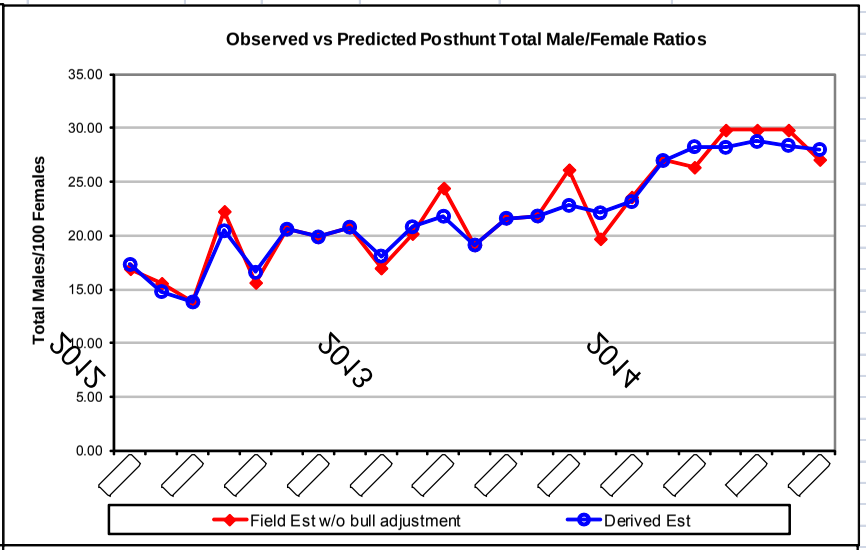
Year	Juvenile/Female Ratio			Total Male/Female Ratio			
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/ bull adj	Field Est w/o bull adj	Field SE
1993		43.31	1.58	17.33	16.93	16.93	0.89
1994		43.56	2.06	14.81	15.58	15.58	1.10
1995		48.91	1.90	13.84	13.89	13.89	0.89
1996		46.68	1.87	20.46	22.27	22.27	1.18
1997		42.22	1.54	16.60	15.65	15.65	0.84
1998		43.39	1.53	20.61	20.63	20.63	0.97
1999		42.93	1.64	19.89	19.89	19.89	1.02
2000		43.17	1.98	20.79	20.79	20.79	1.26
2001		42.86	1.92	18.11	17.00	17.00	1.09
2002		44.82	1.81	20.83	20.20	20.20	1.10
2003		44.74	2.14	21.81	24.43	24.43	1.47
2004		42.59	1.67	19.13	19.14	19.14	1.02
2005		46.55	1.47	21.62	21.62	21.62	0.91
2006		42.94	1.38	21.83	21.83	21.83	0.91
2007		39.23	1.34	22.82	26.14	26.14	1.04
2008		34.33	1.19	22.13	19.72	19.72	0.85
2009		37.44	1.29	23.17	23.60	23.60	0.97
2010		34.17	1.19	26.99	27.02	27.02	1.03
2011		33.19	1.13	28.28	26.37	26.37	0.98
2012		37.52	1.52	28.21	29.82	29.82	1.32
2013		37.52	1.52	28.76	29.82	29.82	1.32
2014		37.52	1.52	28.39	29.82	29.82	1.32
2015		43.17	1.98	28.02	27.08	27.08	1.48

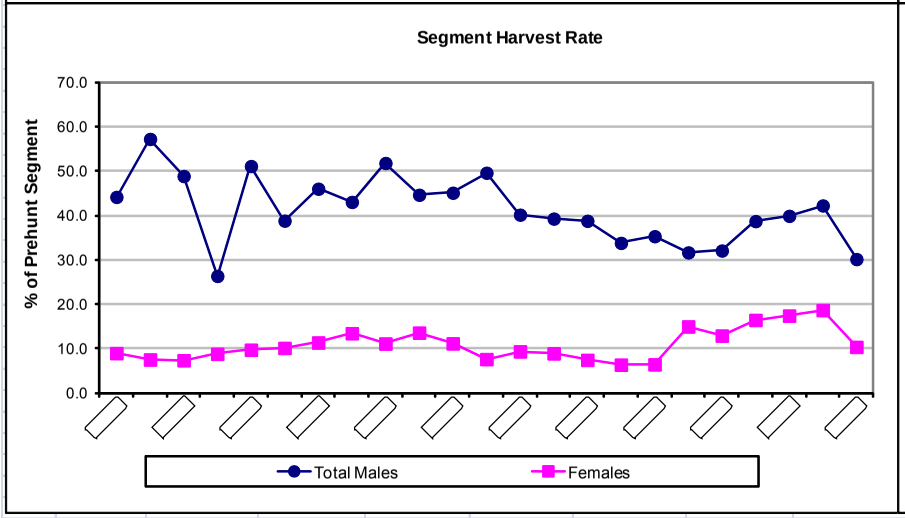
Harvest

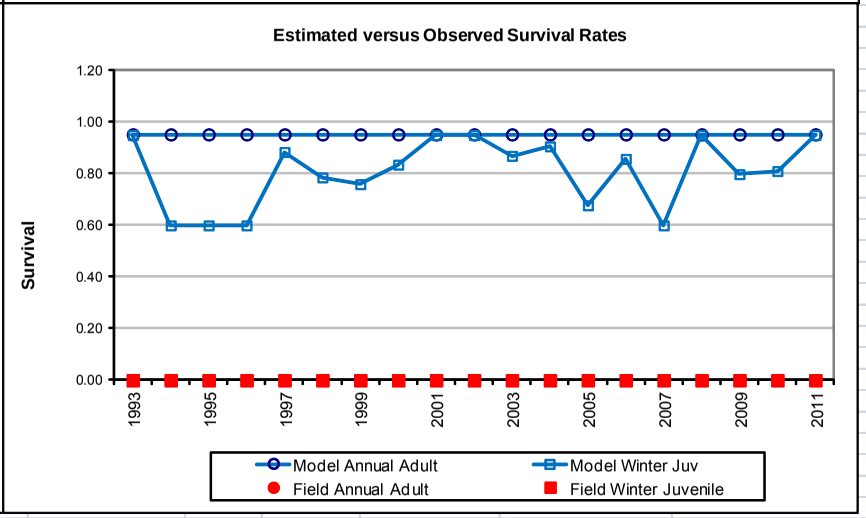
Year	Juv	Yrl males	2+ Males	Females	Total Harvest	Segment Harvest Rate (% of Prehunt Segment)	
						Total Males	Females
1993	98	254	534	569	1455	44.2	9.0
1994	118	462	757	505	1842	57.3	7.6
1995	90	335	482	494	1401	48.9	7.4
1996	100	7	447	601	1155	26.4	8.9
1997	97	405	654	661	1817	51.1	9.8
1998	64	271	546	708	1589	38.9	10.2
1999	212	392	662	800	2066	46.0	11.4
2000	158	313	630	936	2037	43.1	13.5
2001	103	401	775	760	2039	51.8	11.2
2002	231	301	713	951	2196	44.7	13.6
2003	136	452	667	788	2043	45.1	11.2
2004	73	357	889	550	1869	49.6	7.7
2005	137	330	667	713	1847	40.2	9.4
2006	193	272	709	684	1858	39.3	9.0
2007	120	392	664	592	1768	38.8	7.5
2008	82	296	531	501	1410	33.8	6.4
2009	101	361	605	530	1597	35.4	6.5
2010	234	347	548	1263	2392	31.7	15.0
2011	191	263	645	1012	2111	32.1	13.0
2012	294	276	847	1243	2660	38.8	16.5
2013	294	276	847	1243	2660	39.9	17.5
2014	294	276	847	1243	2660	42.3	18.7
2015	100	125	500	600	1325	30.2	10.4

FIGURES


Posthunt Population Estimate
Estimated Posthunt Population
16000
14000
12000
10000
8000
6000
4000
2000
0
2009
2010
2011
Model Population Est
Total Classified
Objective
Sightability Est.


Observed vs Predicted Posthunt Total Male/Female Ratios
Total Males/100 Females
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
2012
2013
2014
Field Est w/o bull adjustment
Derived Est


Segment Harvest Rate
% of Prehunt Segment
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Total Males
Females


Estimated versus Observed Survival Rates
Survival
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
Model Annual Adult
Model Winter Juv
Field Annual Adult
Field Winter Juvenile

Appendix 1. 2012 Sightability survey results, including output (A) and survey blocks.

A.

Aerial Survey for Windows, Version 1.00 Beta 6.1.1 (17-Sep-1999)

Friday, May 10, 2013 05:13 PM

Model: Elk, Hiller 12-E, Idaho (with snow)

[Files]
Title = C:\Program Files\IDFG\Aerial Survey\smelkii.ttl
Summary = C:\Program Files\IDFG\Aerial Survey\smelkii.sum

.....

smelkii

Section 1: Summary of Raw Counts

	Units		Number of Each Class Counted							
Stratum	Sampled	Total	Cows	Bulls	BABull	Calves	Spikes	Raghrn	AdBull	Unclas
1	17	494	306	96	52	90	44	26	26	2
2	23	1302	650	218	105	297	113	61	44	137
3	28	1582	781	222	114	306	108	65	49	273
Total	68	3378	1737	536	271	693	265	152	119	412

Section 2: Summary of Raw Counts for Perfect Visibility Model

This table projects the number of animals that would have been counted if every unit had been flown and visibility had been perfect (no animals obscured by vegetation, etc.)

	No of Units			Number of Each Class Counted							
Strat	Popn	Sample	Total	Cows	Bulls	BABull	Calves	Spikes	Raghrn	AdBull	Unclas
1	103	17	2993	1854	582	315	545	267	158	158	12
2	54	23	3057	1526	512	247	697	265	143	103	322
3	31	28	1752	865	246	126	339	120	72	54	302
Total	188	68	7801	4245	1339	688	1581	651	373	315	636

Section 3: Estimates for Total Number

Total

	Number of Units			**Variance**			**Bound**
Stratum	**Popn.**	**Sample**	**Estimate**	**Sampling**	**Sightability**	**Model**	**95%**
1	**103**	**17**	**3056**	**1044739**	**503**	**4**	**2004**
2	**54**	**23**	**3100**	**438528**	**261**	**2**	**1298**
3	**31**	**28**	**1778**	**18292**	**187**	**2**	**266**
Total	**188**	**68**	**7934**	**1501559**	**951**	**8**	**2402**

Cows

Stratum	Number of Units Popn.	Sample	Estimate	Variance Sampling	Sightability	Model	Bound 95%
1	103	17	1869	486992	113	1	1368
2	54	23	1540	166817	61	0	801
3	31	28	875	6253	56	1	156
Total	188	68	4284	660062	230	2	1593

Bulls

Stratum	Number of Units Popn.	Sample	Estimate	Variance Sampling	Sightability	Model	Bound 95%
1	103	17	624	48291	212	1	432
2	54	23	533	24493	81	1	307
3	31	28	259	364	67	1	41
Total	188	68	1416	73148	360	3	531

Branched-antlered bulls

Stratum	Number of Units Popn.	Sample	Estimate	Variance Sampling	Sightability	Model	Bound 95%
1	103	17	349	14406	185	1	237
2	54	23	264	9204	62	1	189
3	31	28	135	148	46	0	27
Total	188	68	748	23758	293	2	304

Calves

Stratum	Number of Units Popn.	Sample	Estimate	Variance Sampling	Sightability	Model	Bound 95%
1	103	17	550	35956	18	0	372
2	54	23	706	18047	39	0	264
3	31	28	342	1382	11	0	73
Total	188	68	1598	55385	68	0	462

Spikes

Stratum	Number of Units Popn.	Sample	Estimate	Variance Sampling	Sightability	Model	Bound 95%
1	103	17	276	14903	21	0	239
2	54	23	269	4614	7	0	133
3	31	28	124	142	11	0	24
Total	188	68	669	19659	39	0	275

Raghorns

Stratum	Number of Units Popn.	Sample	Estimate	Variance Sampling	Sightability	Model	Bound 95%
1	103	17	172	5034	70	0	140
2	54	23	147	3585	9	0	118
3	31	28	76	49	17	0	16
Total	188	68	395	8668	96	0	183

Adult bulls

Stratum	Number of Units Popn.	Sample	Estimate	Variance Sampling	Sightability	Model	Bound 95%
1	103	17	177	5133	46	0	141
2	54	23	117	1462	43	1	76
3	31	28	59	34	13	0	13
Total	188	68	353	6629	102	1	161

Unclassified

Stratum	Number of Units Popn.	Sample	Estimate	Variance Sampling	Sightability	Model	Bound 95%
1	103	17	12	123	0	0	22
2	54	23	322	29553	0	0	337
3	31	28	302	3331	0	0	113
Total	188	68	636	33007	0	0	356

Section 4: Estimates for Proportions

Cows

Stratum	Number of Units Popn.	Sample	Estimate	Variance Sampling	Sightability	Model	Bound 95%
1	103	17	0.61169	0.00218	0.00001	0.00000	0.09168
2	54	23	0.49662	0.00168	0.00000	0.00000	0.08053
3	31	28	0.49189	0.00034	0.00001	0.00000	0.03667
Total	188	68	0.53991	0.00060	0.00000	0.00000	0.04801

Bulls

Stratum	Number of Units Popn.	Sample	Estimate	Variance Sampling	Sightability	Model	Bound 95%
1	103	17	0.20429	0.00225	0.00001	0.00000	0.09328
2	54	23	0.17185	0.00053	0.00001	0.00000	0.04521
3	31	28	0.14564	0.00009	0.00002	0.00000	0.02002
Total	188	68	0.17848	0.00042	0.00000	0.00000	0.04029

Branched-antlered bulls

Stratum	Number of Units Popn.	Sample	Estimate	Variance Sampling	Sightability	Model	Bound 95%
1	103	17	0.11413	0.00137	0.00002	0.00000	0.07303
2	54	23	0.08512	0.00026	0.00001	0.00000	0.03167
3	31	28	0.07593	0.00007	0.00001	0.00000	0.01764
Total	188	68	0.09424	0.00025	0.00000	0.00000	0.03098

Calves

Stratum	Number of Units Popn.	Sample	Estimate	Variance Sampling	Sightability	Model	Bound 95%
1	103	17	0.18005	0.00090	0.00000	0.00000	0.05893
2	54	23	0.22777	0.00057	0.00000	0.00000	0.04689
3	31	28	0.19252	0.00013	0.00000	0.00000	0.02284
Total	188	68	0.20150	0.00023	0.00000	0.00000	0.02961

Spikes

Stratum	Number of Units Popn.	Sample	Estimate	Variance Sampling	Sightability	Model	Bound 95%
1	103	17	0.09016	0.00044	0.00000	0.00000	0.04126
2	54	23	0.08673	0.00017	0.00000	0.00000	0.02595
3	31	28	0.06970	0.00001	0.00000	0.00000	0.00764
Total	188	68	0.08424	0.00009	0.00000	0.00000	0.01893

Raghorns

Stratum	Number of Units Popn.	Sample	Estimate	Variance Sampling	Sightability	Model	Bound 95%
1	103	17	0.05635	0.00055	0.00001	0.00000	0.04643
2	54	23	0.04732	0.00012	0.00000	0.00000	0.02147
3	31	28	0.04296	0.00002	0.00000	0.00000	0.00957
Total	188	68	0.04983	0.00010	0.00000	0.00000	0.01987

Adult bulls

Stratum	Number of Units Popn.	Sample	Estimate	Variance Sampling	Sightability	Model	Bound 95%
1	103	17	0.05778	0.00045	0.00000	0.00000	0.04165
2	54	23	0.03780	0.00004	0.00000	0.00000	0.01350
3	31	28	0.03297	0.00002	0.00000	0.00000	0.00898
Total	188	68	0.04441	0.00007	0.00000	0.00000	0.01701

Unclassified

Stratum	Number of Units Popn.	Sample	Estimate	Variance Sampling	Sightability	Model	Bound 95%
1	103	17	0.00397	0.00002	0.00000	0.00000	0.00760
2	54	23	0.10375	0.00343	0.00000	0.00000	0.11482
3	31	28	0.16995	0.00093	0.00000	0.00000	0.05993
Total	188	68	0.08016	0.00057	0.00000	0.00000	0.04692

Section 5: Estimates for Ratios

Bulls per 100 Cows

Stratum	Number of Units Popn.	Sample	Estimate	Variance Sampling	Sightability	Model	Bound 95%
1	103	17	33.4	287.7	0.1	0.0	33.2
2	54	23	34.6	136.7	0.2	0.0	22.9
3	31	28	29.6	0.0	0.8	0.0	1.8
Total	188	68	33.1	72.4	0.1	0.0	16.7

Calves per 100 Cows

Stratum	Number of Units Popn.	Sample	Estimate	Variance Sampling	Sightability	Model	Bound 95%
1	103	17	29.4	217.9	0.0	0.0	28.9
2	54	23	45.9	166.9	0.1	0.0	25.3
3	31	28	39.1	0.0	0.2	0.0	1.0
Total	188	68	37.3	63.0	0.0	0.0	15.6

Spikes per 100 Cows

Stratum	Number of Units Popn.	Sample	Estimate	Variance Sampling	Sightability	Model	Bound 95%
1	103	17	14.7	71.2	0.0	0.0	16.5
2	54	23	17.5	31.1	0.0	0.0	10.9
3	31	28	14.2	0.0	0.1	0.0	0.7
Total	188	68	15.6	17.6	0.0	0.0	8.2

Spikes per 100 Bulls

Stratum	Number of Units Popn.	Sample	Estimate	Variance Sampling	Sightability	Model	Bound 95%
1	103	17	44.1	606.8	0.2	0.0	48.3
2	54	23	50.5	275.4	0.2	0.0	32.5
3	31	28	47.9	0.0	1.5	0.0	2.4
Total	188	68	47.2	156.9	0.1	0.0	24.6

Raghorns per 100 Bulls

Stratum	Number of Units Popn.	Sample	Estimate	Variance Sampling	Sightability	Model	Bound 95%
1	103	17	27.6	218.9	0.1	0.0	29.0
2	54	23	27.5	139.2	0.1	0.0	23.1
3	31	28	29.5	0.0	0.8	0.0	1.8
Total	188	68	27.9	62.3	0.1	0.0	15.5

Adult bulls per 100 Bulls

Stratum	Number of Units Popn.	Sample	Estimate	Variance Sampling	Sightability	Model	Bound 95%
1	103	17	28.3	224.8	0.0	0.0	29.4
2	54	23	22.0	67.1	0.0	0.0	16.1
3	31	28	22.6	0.0	0.0	0.0	0.3
Total	188	68	24.9	53.2	0.0	0.0	14.3

Branched-antlered bulls per 100 Bulls

Stratum	Number of Units Popn.	Sample	Estimate	Variance Sampling	Sightability	Model	Bound 95%
1	103	17	55.9	735.3	0.2	0.0	53.2
2	54	23	49.5	382.5	0.2	0.0	38.3
3	31	28	52.1	0.0	1.5	0.1	2.4
Total	188	68	52.8	197.1	0.1	0.0	27.5

Spikes per 100 Branched-antlered bulls

Stratum	Number of Units Popn.	Sample	Estimate	Variance Sampling	Sightability	Model	Bound 95%
1	103	17	79.0	1926.4	1.8	0.1	86.1
2	54	23	101.9	1562.5	3.7	0.1	77.6
3	31	28	91.8	0.0	20.1	0.2	8.8
Total	188	68	89.4	613.3	1.5	0.0	48.6

Section 6: Summary Statistics

Percent correction from perfect visibility model

Stratum	Units Sampled	Total	Cows	Bulls	BABull	Calves	Spikes	Raghrn	AdBull	Unclas
1	17	2.1	0.8	7.3	10.7	0.9	3.3	9.3	12.1	0.0
2	23	1.4	0.9	4.1	7.0	1.3	1.3	2.4	13.4	0.0
3	28	1.5	1.2	5.4	7.0	1.1	3.7	6.2	8.1	0.0
Total	68	1.7	0.9	5.7	8.8	1.1	2.7	6.0	12.0	-0.0

[Total variances (i.e., standard error squared) are in parenthesis]

Total estimates...

7934	(1502518)	Total
4284	(660294)	Cows
1416	(73511)	Bulls
748	(24053)	Branched-antlered bulls
1598	(55453)	Calves
669	(19698)	Spikes
395	(8764)	Raghorns
353	(6732)	Adult bulls
636	(33007)	Unclassified

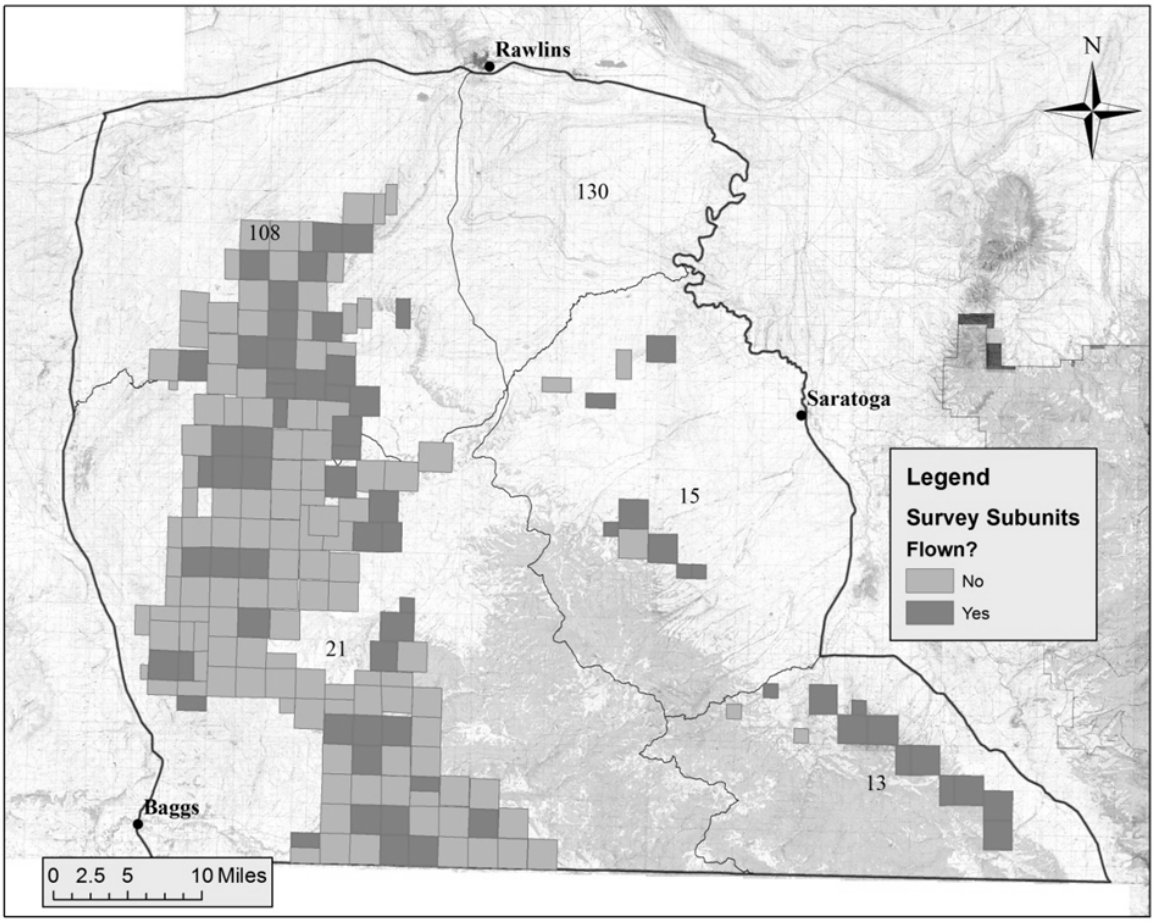
Proportions...

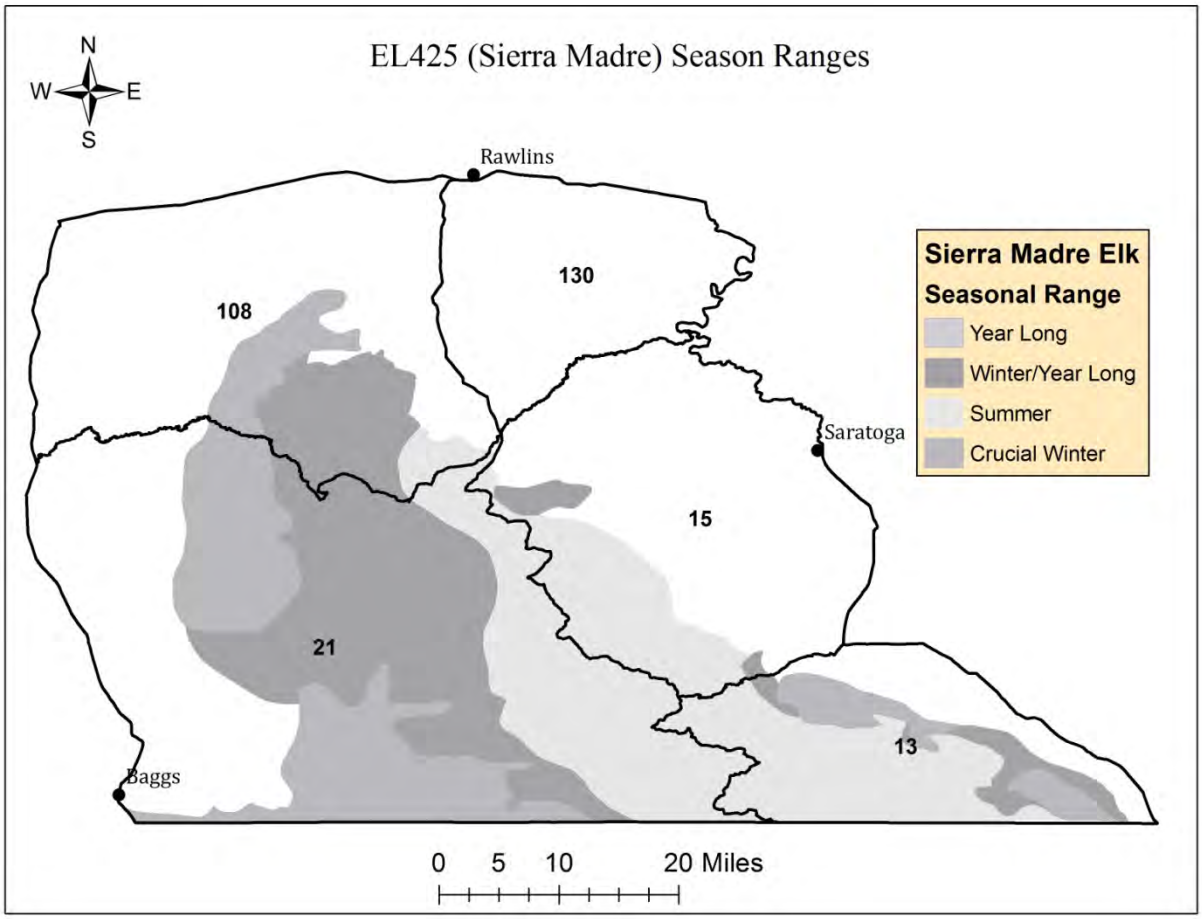
0.5399	(0.000600)	Cows
0.1785	(0.000423)	Bulls
0.0942	(0.000250)	Branched-antlered bulls
0.2015	(0.000228)	Calves
0.0842	(0.000093)	Spikes
0.0498	(0.000103)	Raghorns
0.0444	(0.000075)	Adult bulls
0.0802	(0.000573)	Unclassified

Ratios...

33	(72)	Bulls per 100 Cows
37	(63)	Calves per 100 Cows
16	(18)	Spikes per 100 Cows
47	(157)	Spikes per 100 Bulls
28	(62)	Raghorns per 100 Bulls
25	(53)	Adult bulls per 100 Bulls
53	(197)	Branched-antlered bulls per 100 Bulls
89	(615)	Spikes per 100 Branched-antlered bulls

B.


Rawlins
N
130
108
Saratoga
Legend
Survey Subunits
Flown?
No
Yes
15
21
13
Baggs
0 2.5 5 10 Miles


EL425 (Sierra Madre) Season Ranges
N
W
E
S
Rawlins
130
108
Saratoga
15
21
13
Baggs
Sierra Madre Elk
Seasonal Range
Year Long
Winter/Year Long
Summer
Crucial Winter
0 5 10 20 Miles

2012 - JCR Evaluation Form

SPECIES: Elk

PERIOD: 6/1/2012 - 5/31/2013

HERD: EL426 - STEAMBOAT

HUNT AREAS: 100

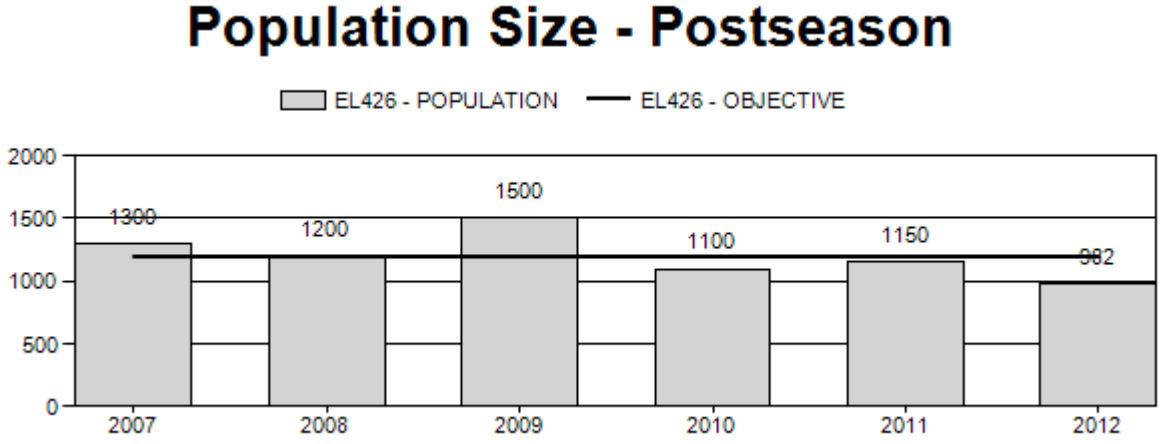
PREPARED BY: PATRICK BURKE

	2007 - 2011 Average	2012	2013 Proposed
Population:	1,250	982	856
Harvest:	339	310	230
Hunters:	409	391	290
Hunter Success:	83%	79%	79%
Active Licenses:	413	400	290
Active License Percent:	82%	78%	79%
Recreation Days:	1,784	1,821	1,400
Days Per Animal:	5.3	5.9	6.1
Males per 100 Females	52	68	
Juveniles per 100 Females	39	47	

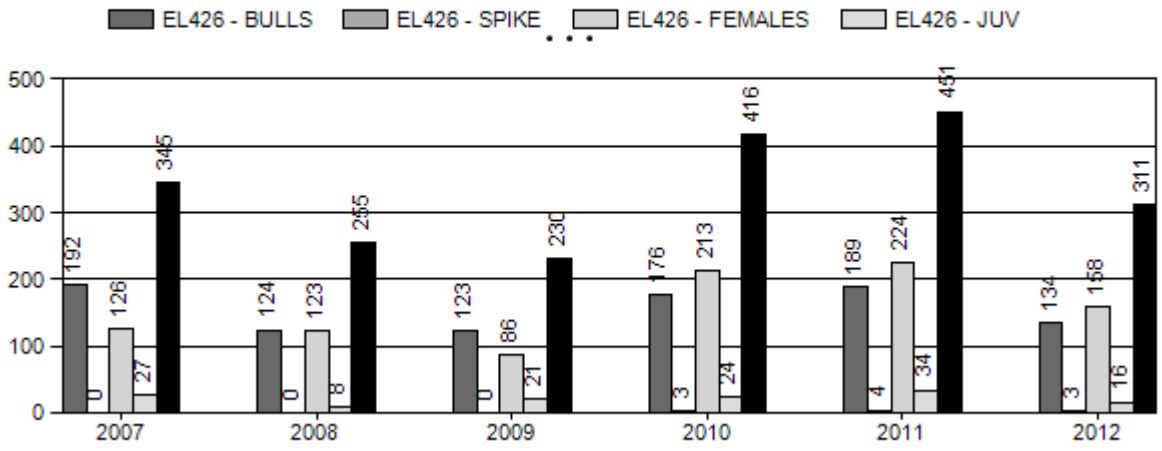
Population Objective:	1,200
Management Strategy:	Special
Percent population is above (+) or below (-) objective:	-18.2%
Number of years population has been + or - objective in recent trend:	3
Model Date:	2/19/2013

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

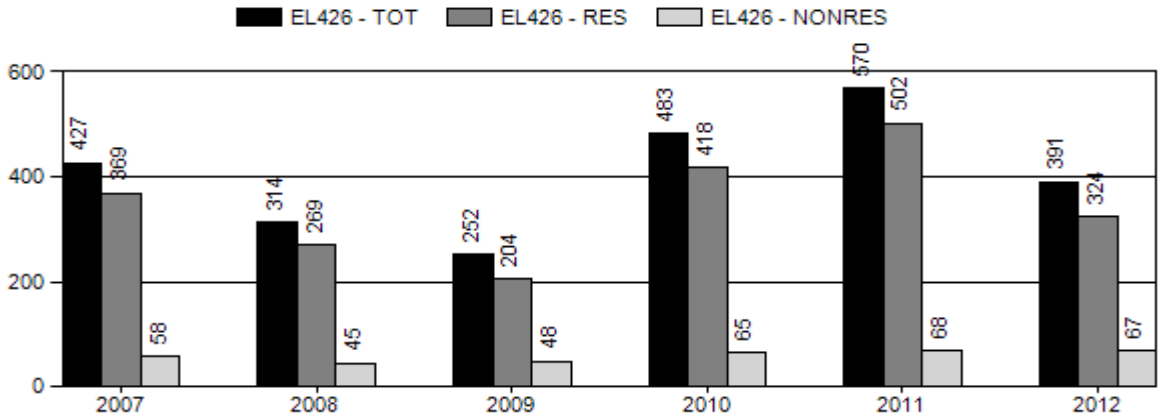
	JCR Year	Proposed
Females ≥ 1 year old:	27.0%	21.9%
Males ≥ 1 year old:	36.5%	40.1%
Juveniles (< 1 year old):	13.0%	4.9%
Total:	27.5%	20.5%
Proposed change in post-season population:	-24.8%	-12.8%



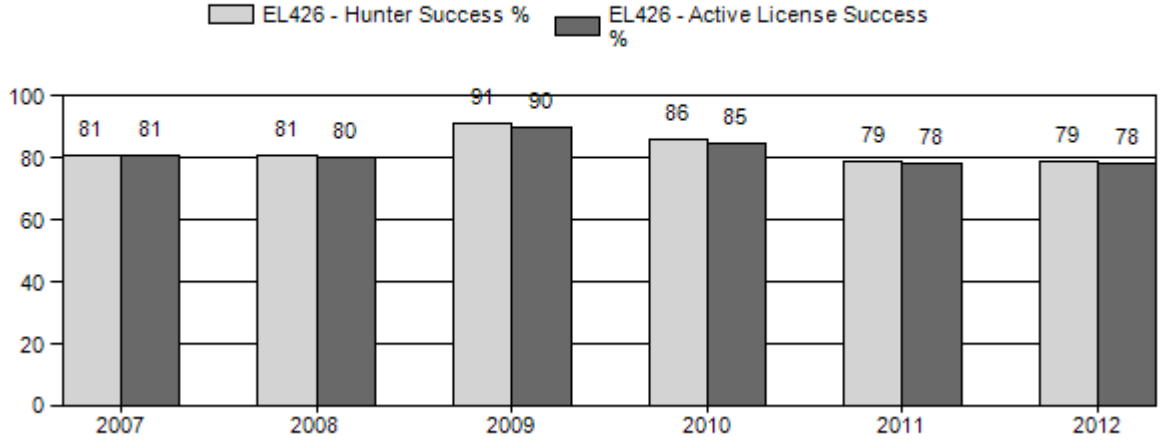
Harvest



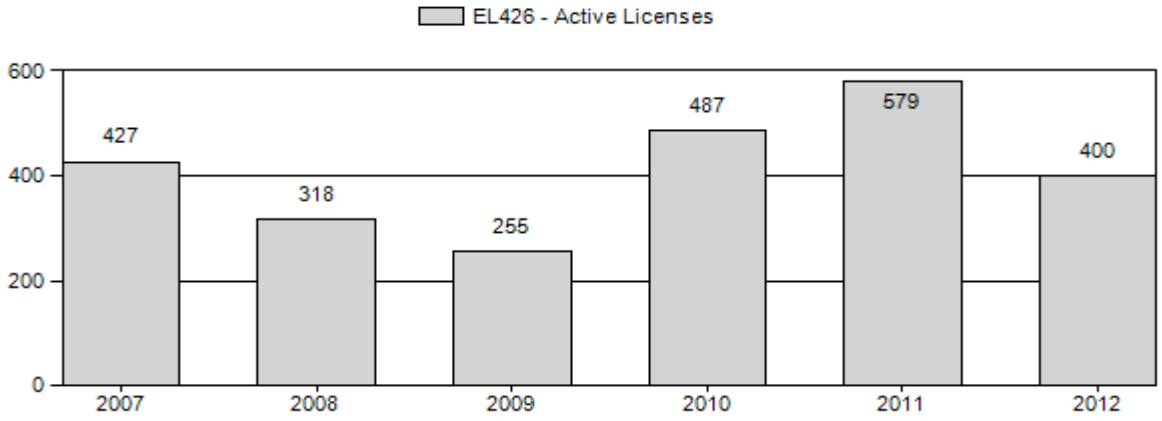
Number of Hunters



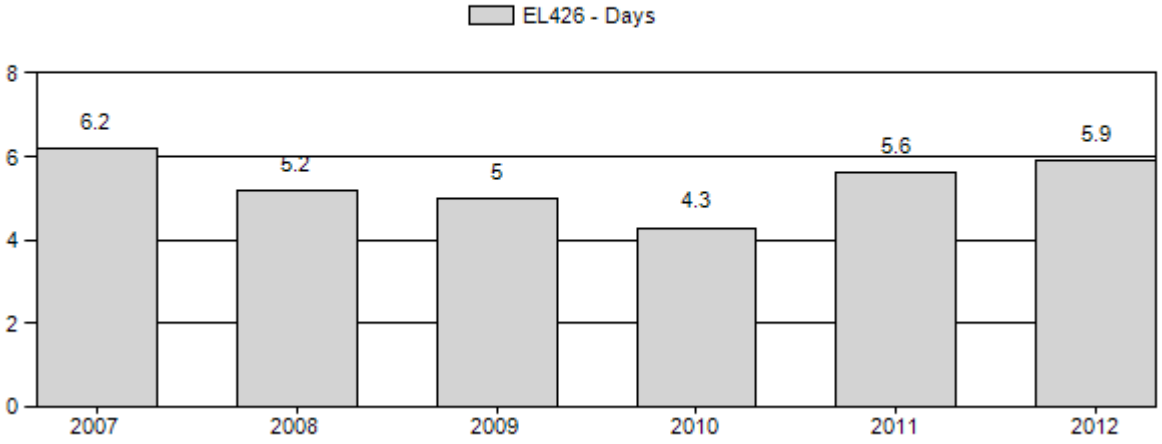
Harvest Success



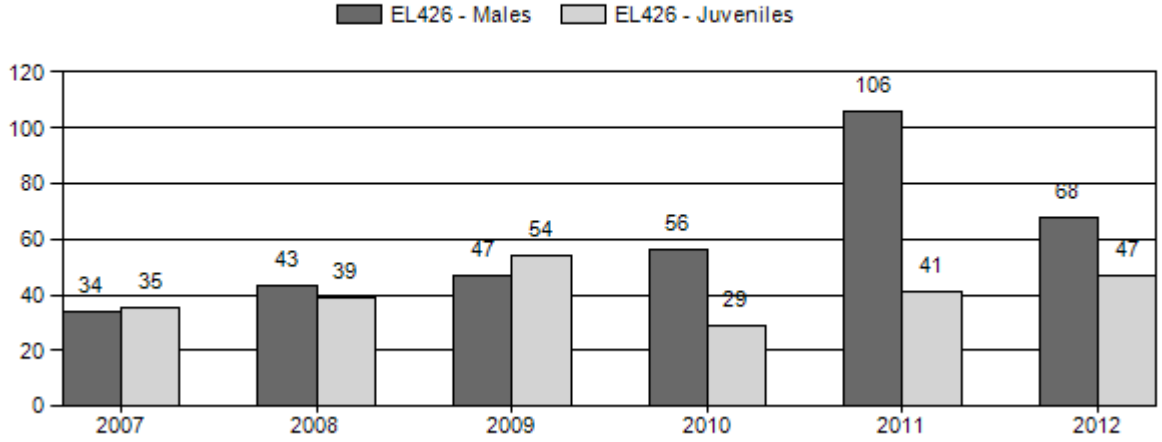
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2007 - 2012 Postseason Classification Summary

for Elk Herd EL426 - STEAMBOAT

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2007	1,300	54	56	110	20%	320	59%	111	21%	541	517	17	18	34	± 5	35	± 5	26
2008	1,200	72	126	198	24%	460	55%	180	21%	838	427	16	27	43	± 3	39	± 3	27
2009	1,500	78	158	236	23%	504	50%	274	27%	1,014	519	15	31	47	± 0	54	± 0	37
2010	1,100	168	243	411	30%	739	54%	217	16%	1,367	657	23	33	56	± 0	29	± 0	19
2011	1,150	45	131	176	43%	166	40%	68	17%	410	505	27	79	106	± 12	41	± 6	20
2012	982	102	171	273	32%	403	47%	189	22%	865	0	25	42	68	± 2	47	± 2	28

2013 HUNTING SEASONS
STEAMBOAT ELK HERD (EL426)

Hunt Area	Type	SEASON DATES Opens	Closes	Quota	Limitations
100	1	Oct. 15	Oct. 31	125	Limited quota; antlered elk
	4	Oct. 15	Oct. 31	100	Limited quota; antlerless elk
	6	Oct. 01	Nov. 20	50	Limited quota; cow or calf elk valid in that portion of Area 100 east of the Red Creek Road (BLM Road 3219) and north of the Rocky Crossing Road (BLM Road 3214) and the Osborne Road (BLM Road 3212)
	7	Oct. 01	Oct. 31	25	Limited quota; cow or calf elk valid in that portion of Area 100 east of U.S. Highway 191, south of Sweetwater County Road 17 and Sweetwater
Archery		Sept. 01	Sept. 30		Refer to license type and limitations in Section 3.

Hunt Area	Type	Quota change from 2012
100	1	-50
	4	-25
	7	-25
Herd Unit Total	**1**	**-50**
	4	**-25**
	7	**-25**

Management Evaluation

Current Management Objective: 1,200
Management Strategy: Special
2012 Postseason Population Estimate: ~1,000
2013 Proposed Postseason Population Estimate: ~850

The population objective for the Steamboat elk herd of 1,200 elk post-season was set in 2002. This special management herd has been above objective since the objective for much of its history with the population peaking around the year 2000. Since then increased harvest levels and slightly decreased calf ratios have caused the population to decline to the point that current estimates place this herd below objective.

Herd Unit Issues

The 2012 post-season population estimate was approximately 1,000 elk with a declining trend. Classifications on the Steamboat herd were conducted from a helicopter during December 2012. The resulting observed ratios from the aerial classification efforts were 47 calves per 100 cows and 68 total bulls per 100 cows with almost 37% of all bulls classified being yearlings. This high proportion of yearlings in the post-hunt population is probably caused by the open nature of the area this herd occupies and a preference for harvesting branch antlered bulls by the hunting public. This over selection of the larger bulls in this population is something that should be addressed in future season structures for this herd.

Weather

The summer of 2012 was extremely dry with little summer precipitation. This lack of moisture was especially evident in areas of Southwest Wyoming below 8,000 ft, which represents the entire Steamboat Elk Herd Unit. Due to the hardy nature of elk and the relatively low densities of elk in the herd unit, the drought conditions will probably not have any population level impacts on this herd.

Habitat

No habitat transects targeting deer range were conducted within the Steamboat Herd Unit. However, the summer of 2012 was one of the driest summers on record in Wyoming. The drought conditions during the summer of 2012, while not likely to have any population level impacts on the Steamboat Elk Herd will certainly have negative consequences for habitat conditions since little plant growth occurred during 2012.

Field Data

It is believed that the observed bull to cow ratio, while not as biased as previous observed ratios, is still somewhat unreliable due to an inability to locate cow groups with the flight time available to classify this herd. The cow/calf groups tend to winter in different areas each winter and can be fairly nomadic since the entire hunt area is suitable elk winter range. Contrary to a typical elk population, in the Steamboat elk herd the bull groups tend to be more predictable in their

wintering areas than is the female segment of the population. Therefore, the observed bull to cow ratio should be considered influenced by missing cow/calf groups in the classification and probably does not represent biological reality.

Harvest Data

Because of the special management status of this herd, hunters who draw a Type 1 license are asked to voluntarily submit tooth samples from harvested bulls for cementum annuli analysis. Based on the 67 tooth samples submitted from the 2012 hunting season, the average age of harvested bulls was 4.9 years old. This compares to 5.4 years old in 2011, 5.5 years old in 2010, 6.5 years old in 2009. The oldest age class of bull harvested in 2012 was 7.5 years old with three bulls being aged by the laboratory to be that old. The oldest bull aged in 2011 was 9.5 years old, the oldest bull aged in 2010 was 10.5 years old, the oldest aged in 2009 was 12.5 years old and the oldest in 2008 was 13.5 years old. This reduction in the average age of harvest bulls and the decline in the oldest age class harvested can probably be attributed to an overall smaller population and to the increased bull harvest rates of the last several years. According the model estimates over 40% of the male segment is being harvested annually in the herd with most of that harvest coming from the older aged males.

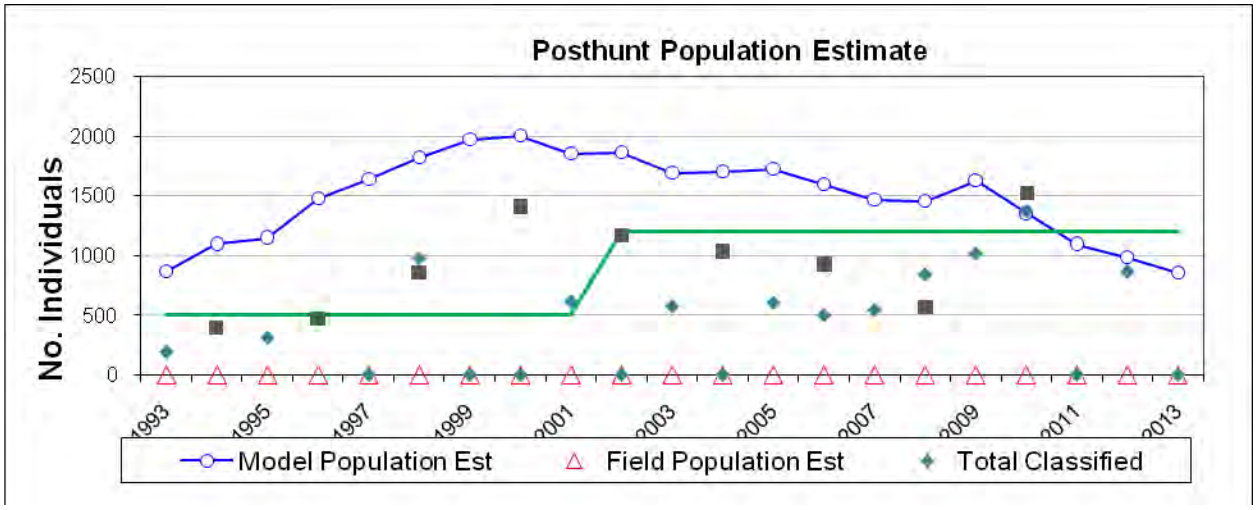
Population

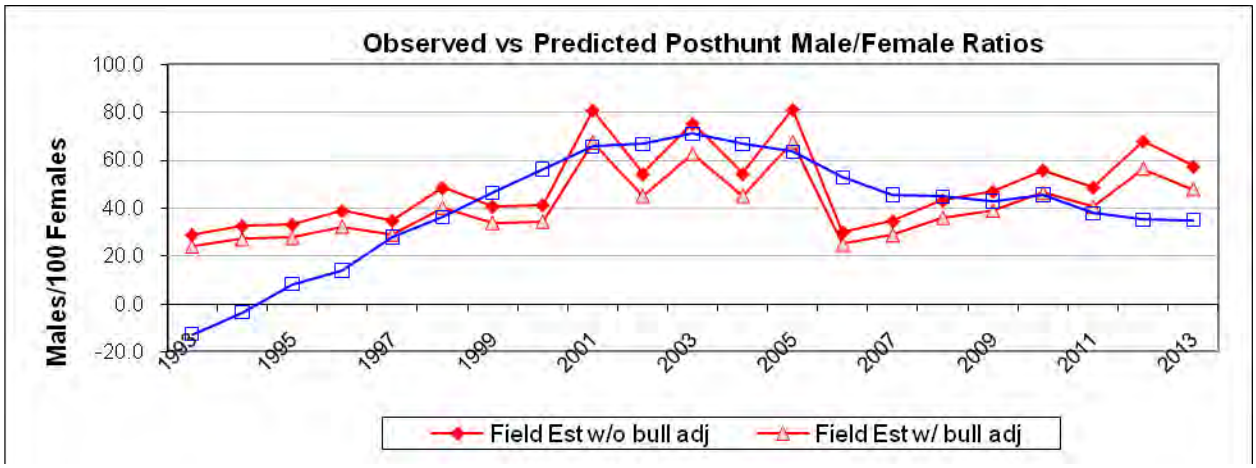
The population model for this herd tracks only moderately well to poorly with observed data. The general post-season population estimate trend however does tracks reasonably well with trend count numbers with the exception of the outlier post-hunt population size point observed during a trend count flown in the severe winter of 2010. However, the model has a hard time accommodating the high bull ratios that are sometimes observed during difficult data collection years in this population.

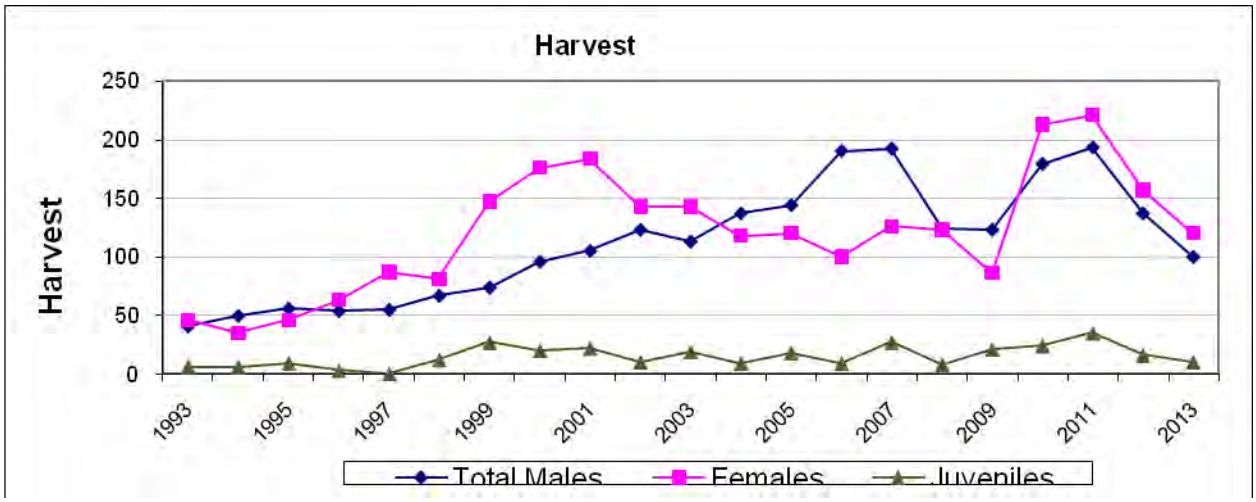
Management Summary

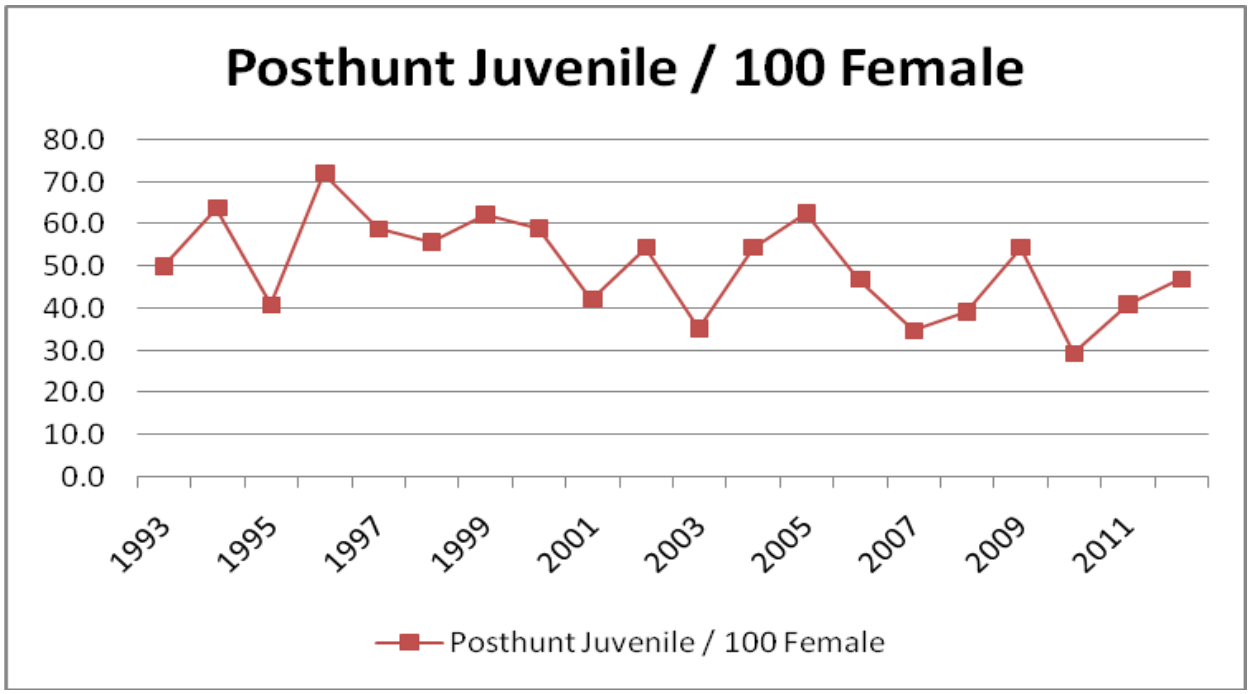
The 2013 season includes decreases in the Type 1, 4, and 6 licenses. The decrease in the Type 1 and Type 4 licenses is being proposed because the current population model is estimating this herd as being under its population objective. A reduction in the number of Type 7 licenses is also being proposed in response to an overall decreased population size along with success rates for that license type decreasing slightly.

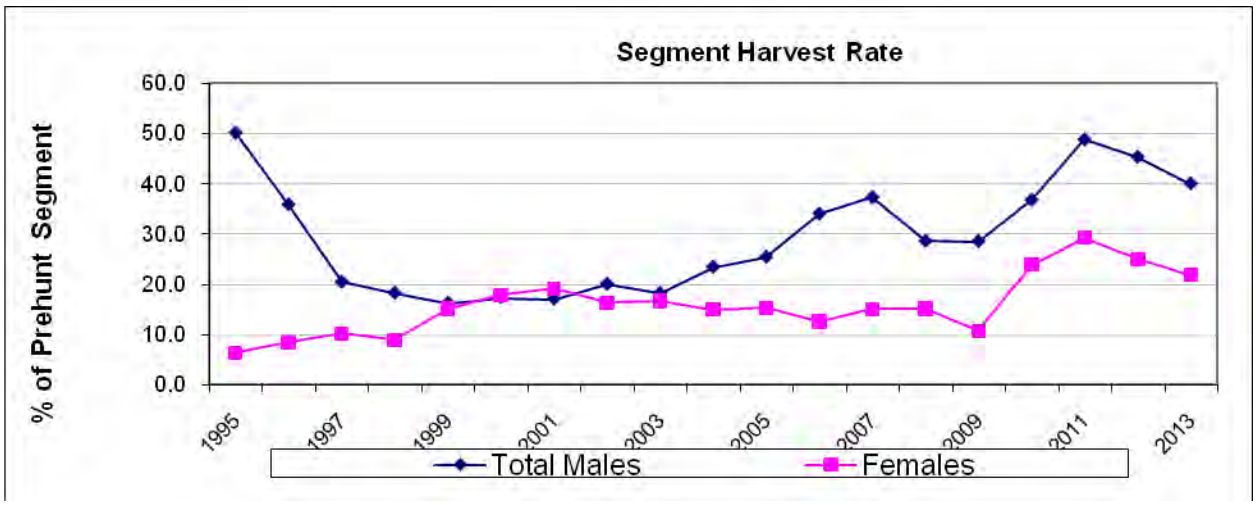
It is anticipated that the season for 2013 will result in the harvest of approximately 140 bulls, 160 cows and 15 sub-adult elk. The proposed seasons will also result in a projected 2013 post-hunt population of roughly 850 elk, which is below its population objective of 1,200 elk post-season.

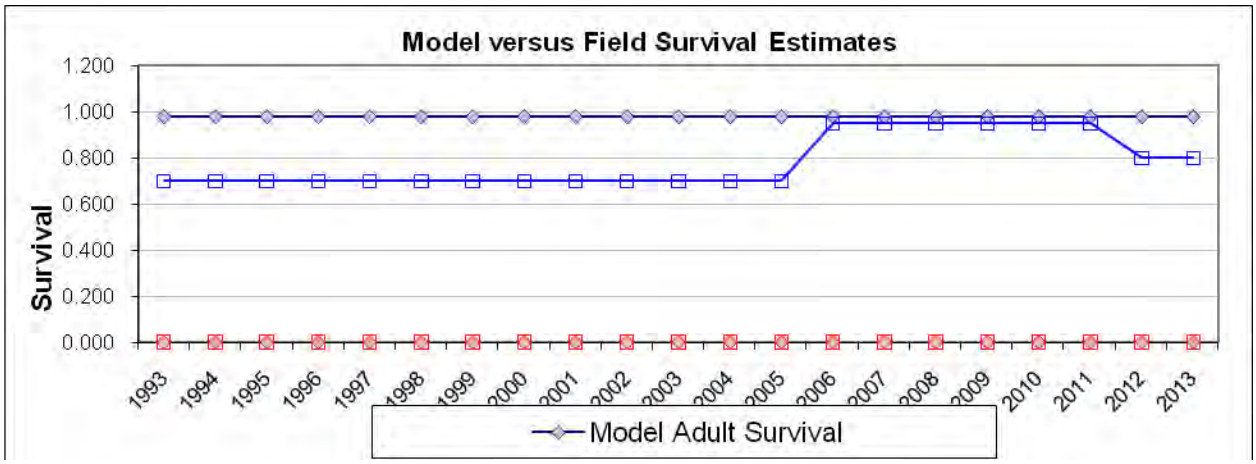

Posthunt Population Estimate
No. Individuals
2500
2000
1500
1000
500
0
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
Model Population Est
Field Population Est
Total Classified


Observed vs Predicted Posthunt Male/Female Ratios
Males/100 Females
100.0
80.0
60.0
40.0
20.0
0.0
-20.0
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
Field Est w/o bull adj
Field Est w/ bull adj


Harvest
Harvest
250
200
150
100
50
0
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
Total Males
Females
Juveniles


Posthunt Juvenile / 100 Female
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
Posthunt Juvenile / 100 Female


Segment Harvest Rate
% of Prehunt Segment
60.0
50.0
40.0
30.0
20.0
10.0
0.0
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
Total Males
Females


Model versus Field Survival Estimates
Survival
1.200
1.000
0.800
0.600
0.400
0.200
0.000
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Model Adult Survival

INPUT	
Species:	Elk
Biologist:	Patrick Burke
Herd Unit & No.:	Steamboat EL430
Model date:	02/19/12

Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report
CJ,CA	Constant Juvenile & Adult Survival	348	357	CJ,CA Model
SCJ,SCA	Semi-Constant Juvenile & Semi-Constant Adult Survival	206	215	SCJ,SCA Mode
TSJ,CA	Time-Specific Juvenile & Constant Adult Survival	282	380	☑ TSJ,CA Model
TSJ,CA,MSC	Time-Specific Juv, Constant Adult Survival, Male survival coefficient	304	411	TSJ,CA,MSC Model

Population Estimates from Top Model

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population				Predicted Posthunt Population				Objective
	Field Est	Field SE		Juveniles	Total Males	Females	Total	Juveniles	Total Males	Females	Total	
1993				321	-34	679	966	314	-79	628	864	500
1994			400	443	33	726	1202	437	-25	685	1097	500
1995				325	128	825	1278	315	64	772	1151	500
1996			474	575	173	866	1614	572	111	794	1477	500
1997				517	309	978	1804	517	245	878	1640	500
1998			859	542	421	1041	2005	529	344	948	1821	500
1999				618	523	1114	2255	588	437	945	1971	500
2000			1415	570	635	1132	2337	548	524	930	2002	500
2001				400	705	1103	2209	376	585	892	1852	500
2002			1172	469	705	1005	2179	458	563	841	1862	1200
2003				309	712	984	2006	288	582	820	1690	1200
2004			1038	428	671	904	2004	418	514	769	1701	1200
2005				496	650	900	2046	476	484	762	1722	1200
2006			929	383	641	913	1938	374	423	798	1595	1200
2007				312	592	960	1864	283	371	815	1468	1200
2008			568	318	498	933	1749	310	355	791	1456	1200
2009				471	495	922	1888	448	354	823	1625	1200
2010			1524	254	559	1020	1833	227	353	775	1356	1200
2011				290	454	867	1611	251	233	613	1097	1200
2012				271	347	720	1338	253	190	540	982	1200
2013				203	287	630	1120	192	172	492	856	1200
2014												
2015												
2016												
2017												
2018												
2019												
2020												
2021												
2022												
2023												
2024												
2025												

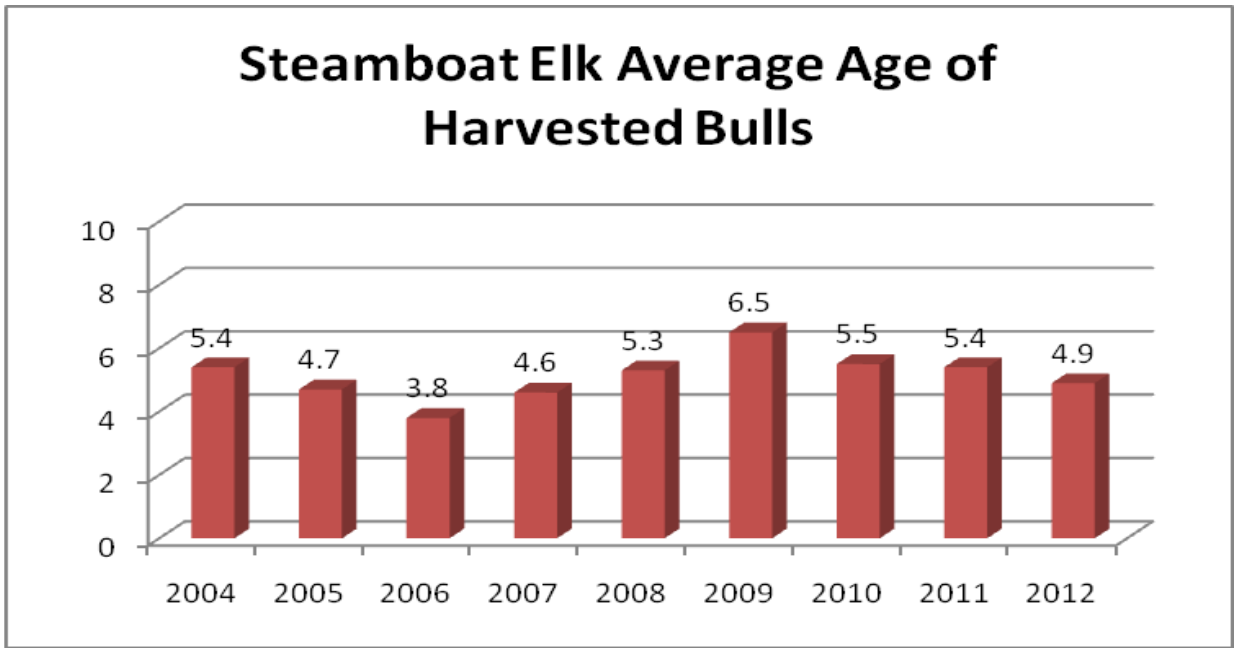
Survival and Initial Population Estimates

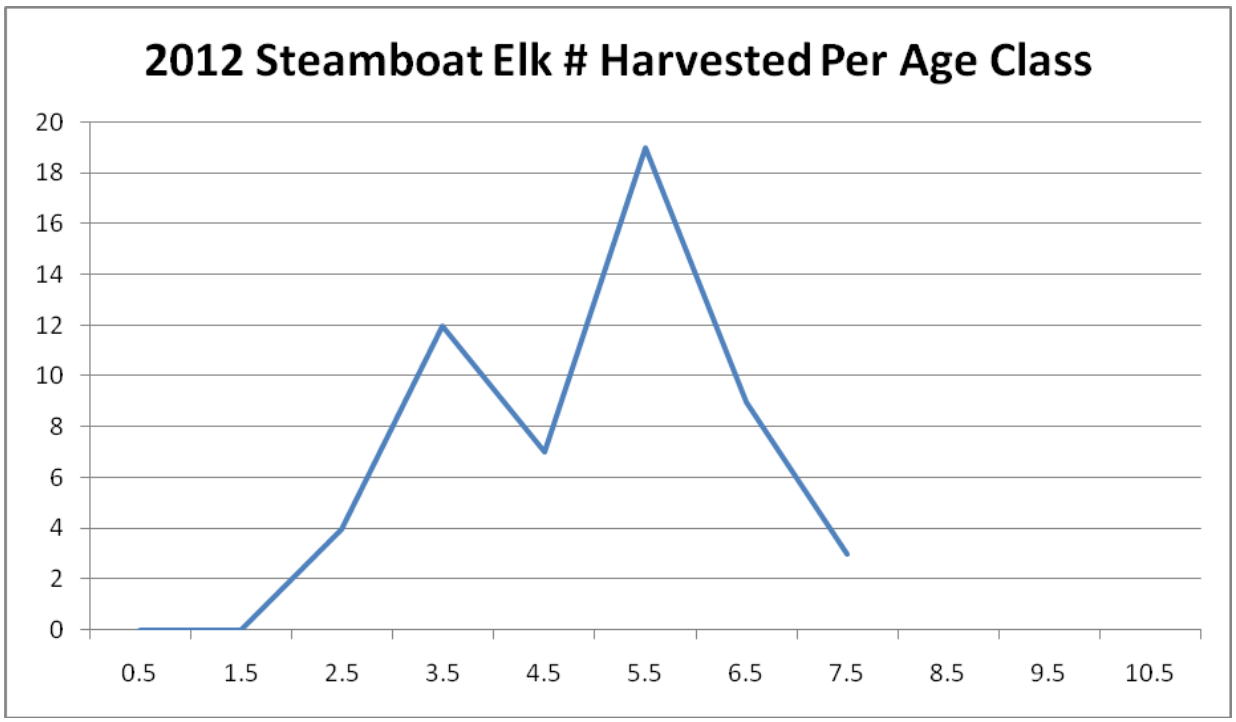
Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1993	0.70			0.98		
1994	0.70			0.98		
1995	0.70			0.98		
1996	0.70			0.98		
1997	0.70			0.98		
1998	0.70			0.98		
1999	0.70			0.98		
2000	0.70			0.98		
2001	0.70			0.98		
2002	0.70			0.98		
2003	0.70			0.98		
2004	0.70			0.98		
2005	0.70			0.98		
2006	0.95			0.98		
2007	0.95			0.98		
2008	0.95			0.98		
2009	0.95			0.98		
2010	0.95			0.98		
2011	0.95			0.98		
2012	0.80			0.98		
2013	0.80			0.98		
2014						
2015						
2016						
2017						
2018						
2019						
2020						
2021						
2022						
2023						
2024						
2025						

Parameters:	Optim cells
Adult Survival =	0.980
Initial Total Male Pop/10,000 =	-0.008
Initial Female Pop/10,000 =	0.063

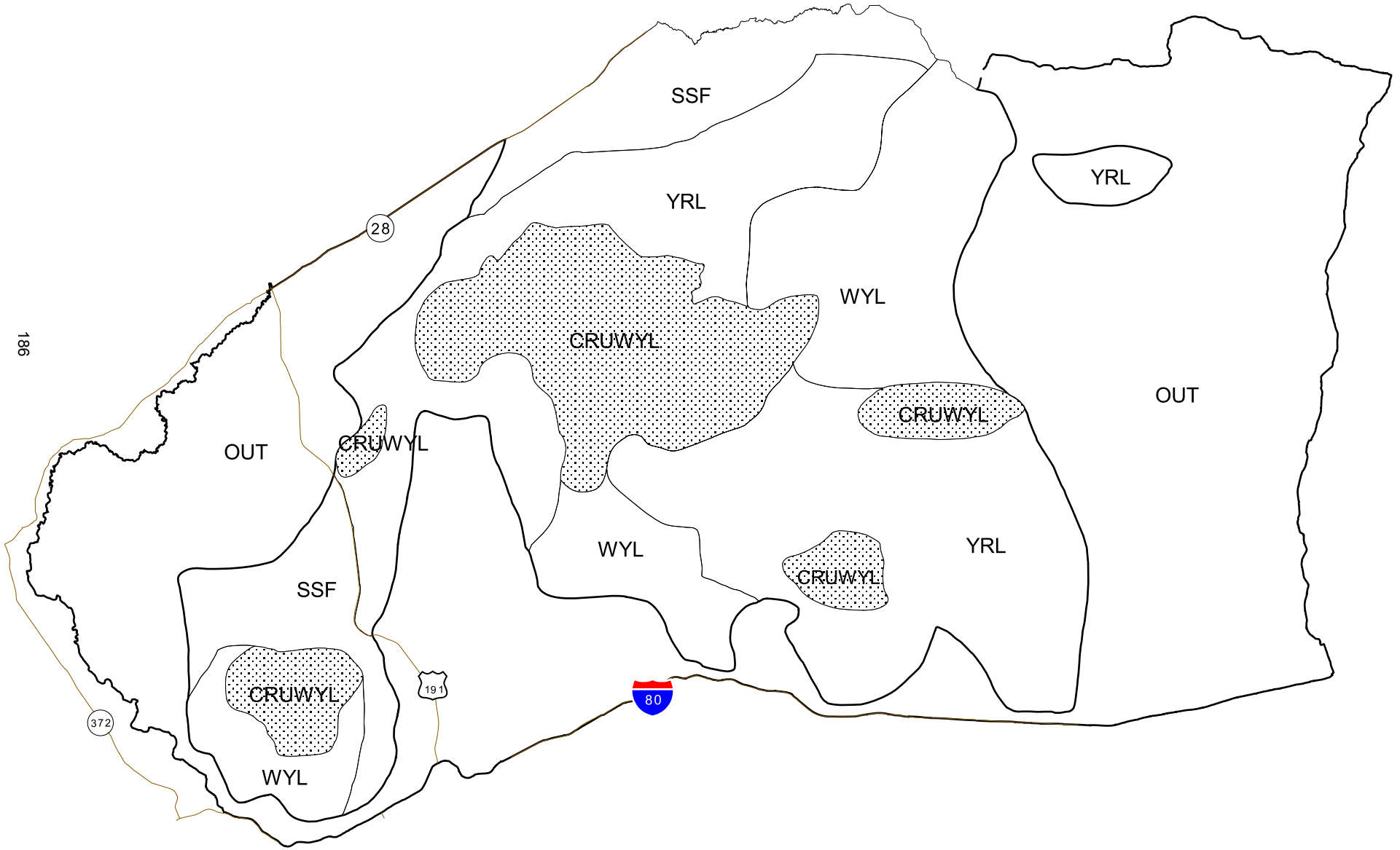
MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	15%
Wounding Loss (females) =	15%
Wounding Loss (juveniles) =	10%
Total Bulls Adjustment Factor	120%

Classification Counts							Harvest				
Juvenile/Female Ratio			Total Male/Female Ratio								
Derived Est	Field Est	Field SE	Derived Est	Field Est w/ bull adj	Field Est w/o bull adj	Field SE	Juv	Yrl males	2+ Males	Females	Total Harvest
	50.00	8.33	-12.57	23.92	28.70	5.85	6	7	34	46	93
	63.73	7.15	-3.64	26.96	32.35	4.58	6	13	37	35	91
	40.78	5.66	8.30	27.47	32.96	4.95	9	12	44	46	111
	72.00	7.42	13.96	32.22	38.67	4.88	3	2	52	63	120
	58.84	6.74	27.95	28.88	34.66	4.80	0	0	55	87	142
	55.77	4.27	36.31	40.18	48.22	3.87	12	1	66	81	160
	62.20	6.14	46.27	33.76	40.51	4.52	27	2	72	147	248
	58.93	5.72	56.36	34.28	41.13	4.40	20	5	91	176	292
	42.18	4.67	65.58	67.27	80.73	7.28	22	2	103	184	311
	54.44	5.51	66.97	45.10	54.12	5.40	10	2	121	143	276
	35.16	4.17	71.01	62.58	75.09	6.94	19	2	111	143	275
	54.44	5.51	66.86	45.10	54.12	5.40	9	8	129	118	264
	62.50	6.40	63.60	67.54	81.05	7.69	18	2	142	120	282
	46.81	4.94	52.99	24.82	29.79	3.70	9	10	180	100	299
	34.69	3.82	45.55	28.65	34.38	3.80	27	0	192	126	345
	39.13	3.44	44.90	35.87	43.04	3.66	8	0	124	123	255
	54.37	4.08	42.96	39.02	46.83	3.69	21	0	123	86	230
	29.36	2.27	45.63	46.35	55.62	3.42	24	3	176	213	416
	40.95	3.26	37.92	40.41	48.49	3.59	35	4	189	221	449
	46.90	4.13	35.14	56.45	67.74	5.31	16	3	134	157	310
	39.07	3.22	34.96	47.74	57.28	4.11	10	1	99	120	230


Steamboat Elk Average Age of Harvested Bulls
10
8
6
4
2
0
5.4
4.7
3.8
4.6
5.3
6.5
5.5
5.4
4.9
2004
2005
2006
2007
2008
2009
2010
2011
2012


2012 Steamboat Elk # Harvested Per Age Class
20
18
16
14
12
10
8
6
4
2
0
0.5
1.5
2.5
3.5
4.5
5.5
6.5
7.5
8.5
9.5
10.5

ELK -- Steamboat
Herd 426
Hunt Area 100
Revised 5/2004



2012 - JCR Evaluation Form

SPECIES: Elk | PERIOD: 6/1/2012 - 5/31/2013

HERD: EL428 - WEST GREEN RIVER

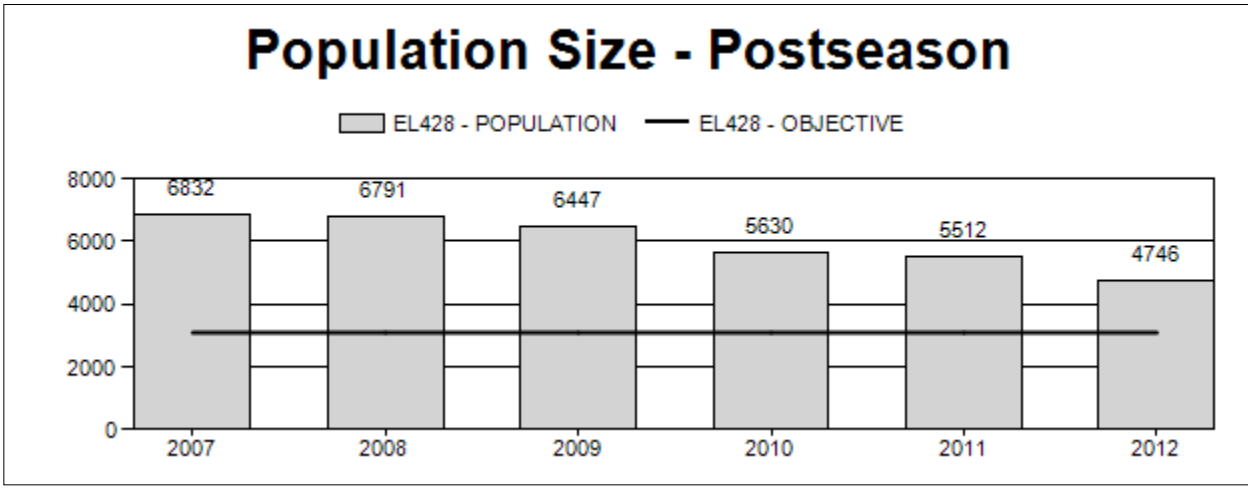
HUNT AREAS: 102-105 | PREPARED BY: JEFF SHORT

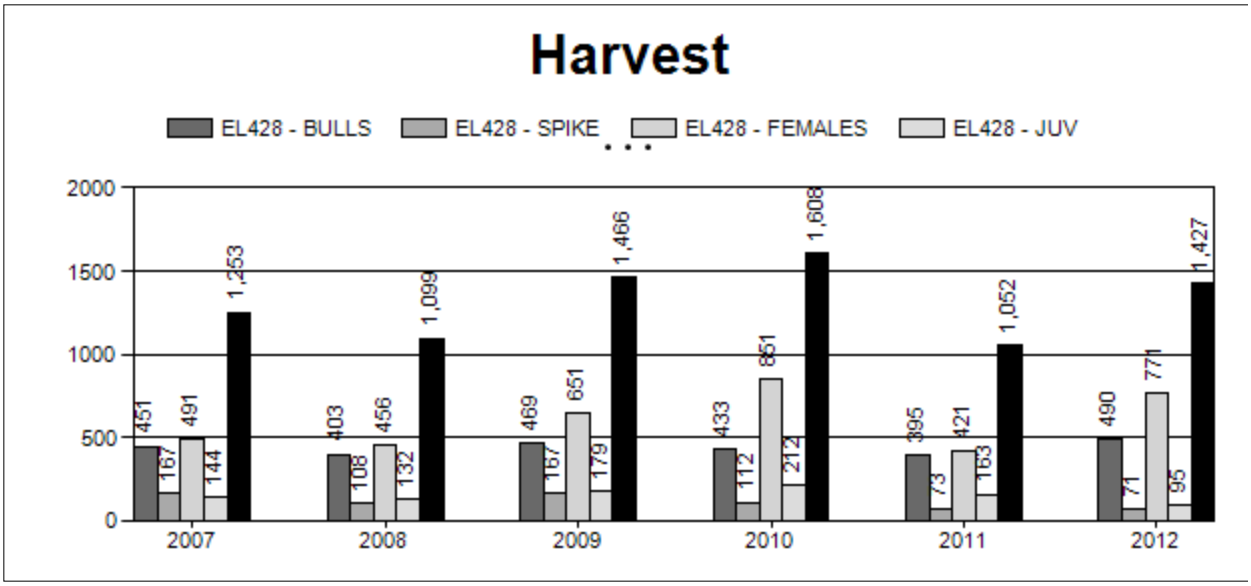
	2007 - 2011 Average	2012	2013 Proposed
Population:	6,242	4,746	3,780
Harvest:	1,296	1,427	1,500
Hunters:	3,900	4,344	4,500
Hunter Success:	33%	33%	33%
Active Licenses:	4,044	4,541	4,700
Active License Percent:	32%	31%	32%
Recreation Days:	27,100	30,382	32,000
Days Per Animal:	20.9	21.3	21.3
Males per 100 Females	28	0	
Juveniles per 100 Females	36	0	

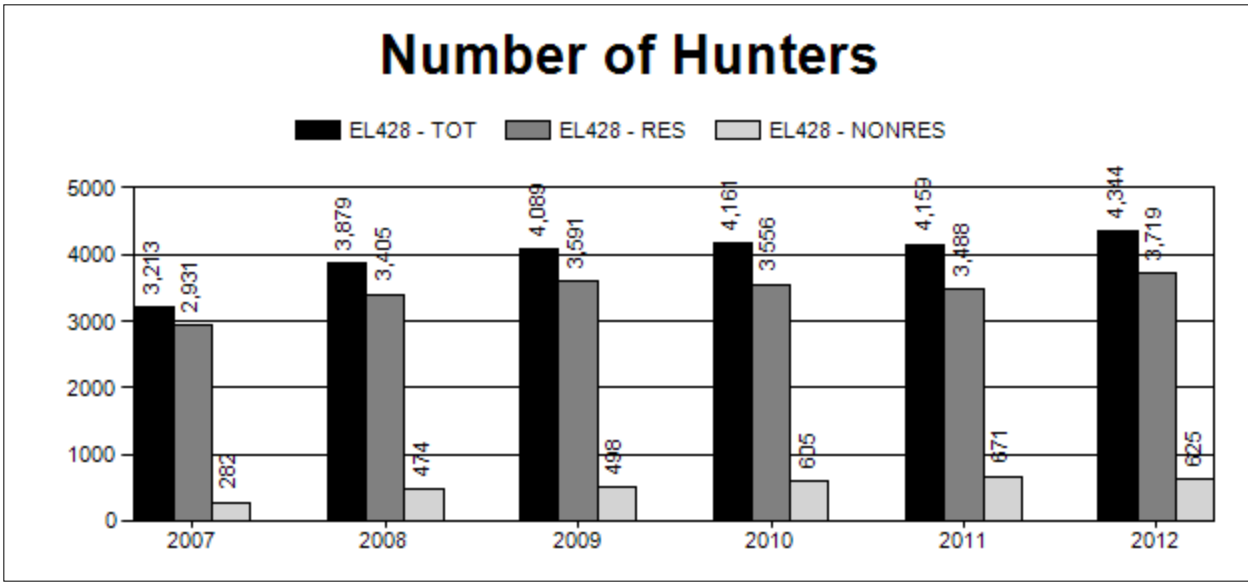
Population Objective:	3,100
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	53%
Number of years population has been + or - objective in recent trend:	10
Model Date:	03/01/2013

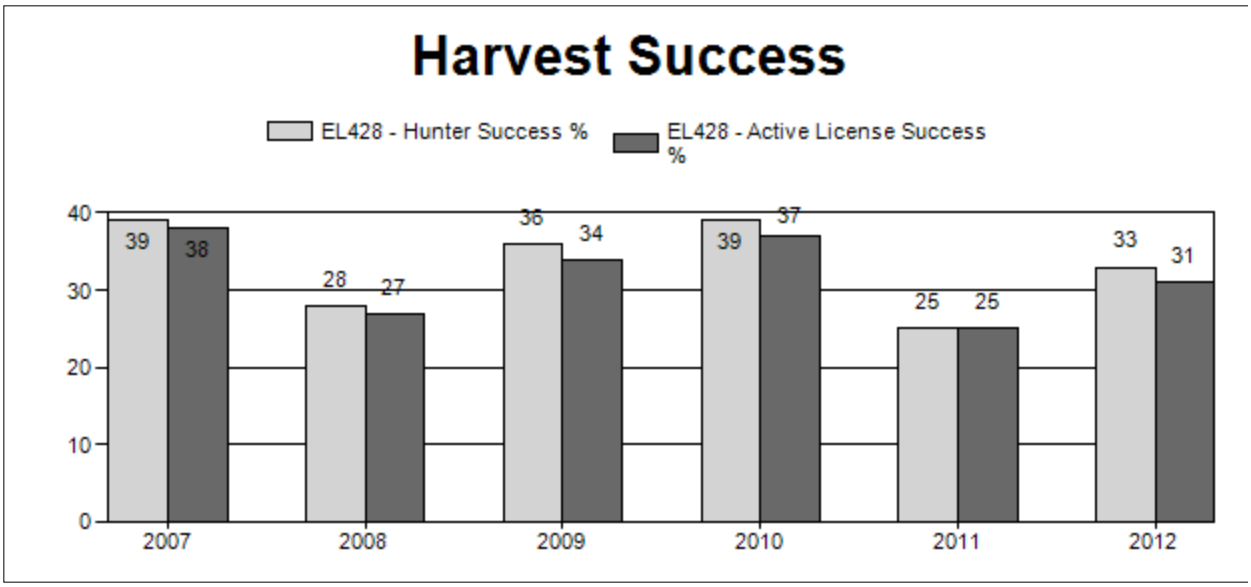
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

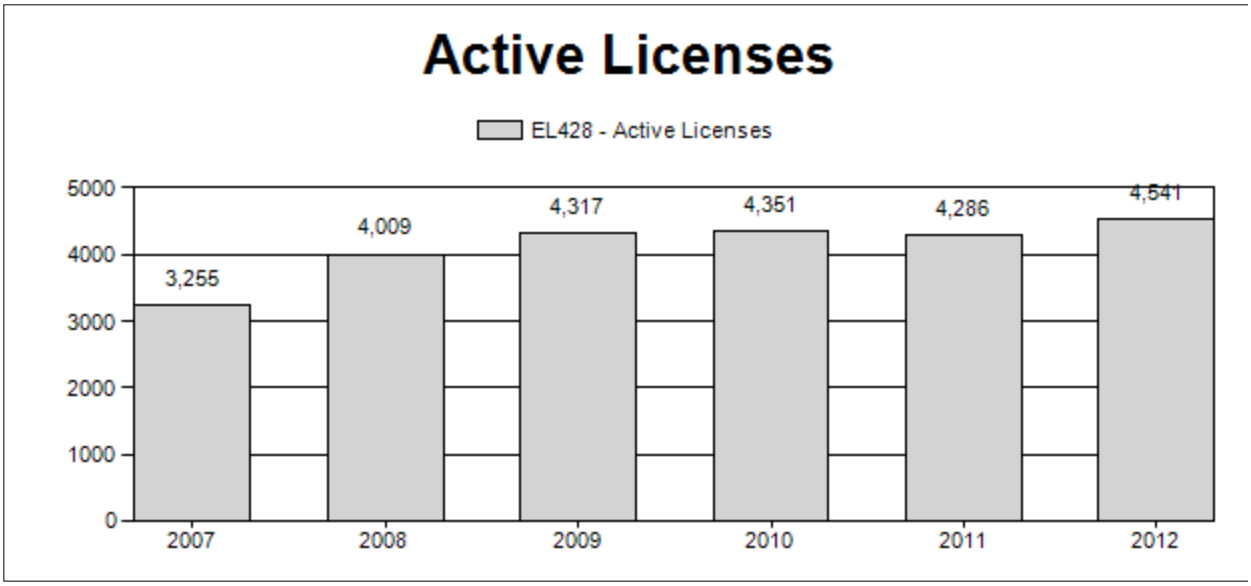
	JCR Year	Proposed
Females ≥ 1 year old:	22.7%	28.4%
Males ≥ 1 year old:	42.7%	48.4%
Juveniles (< 1 year old):	8.9%	11.2%
Total:	22.8%	27.6%
Proposed change in post-season population:	-47.1%	-20.4%

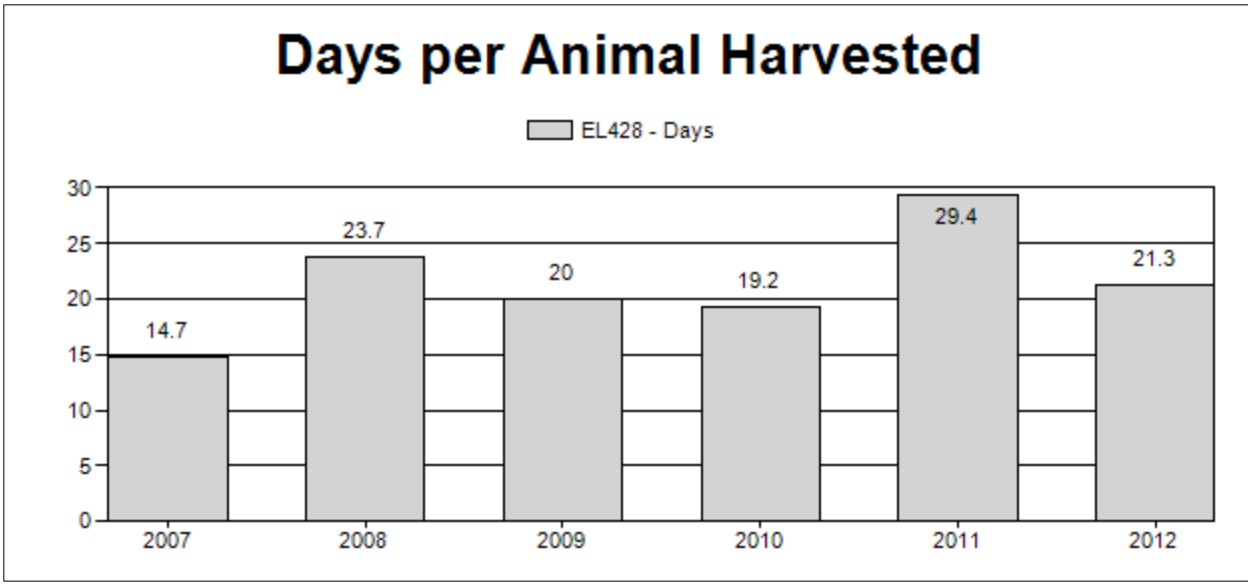


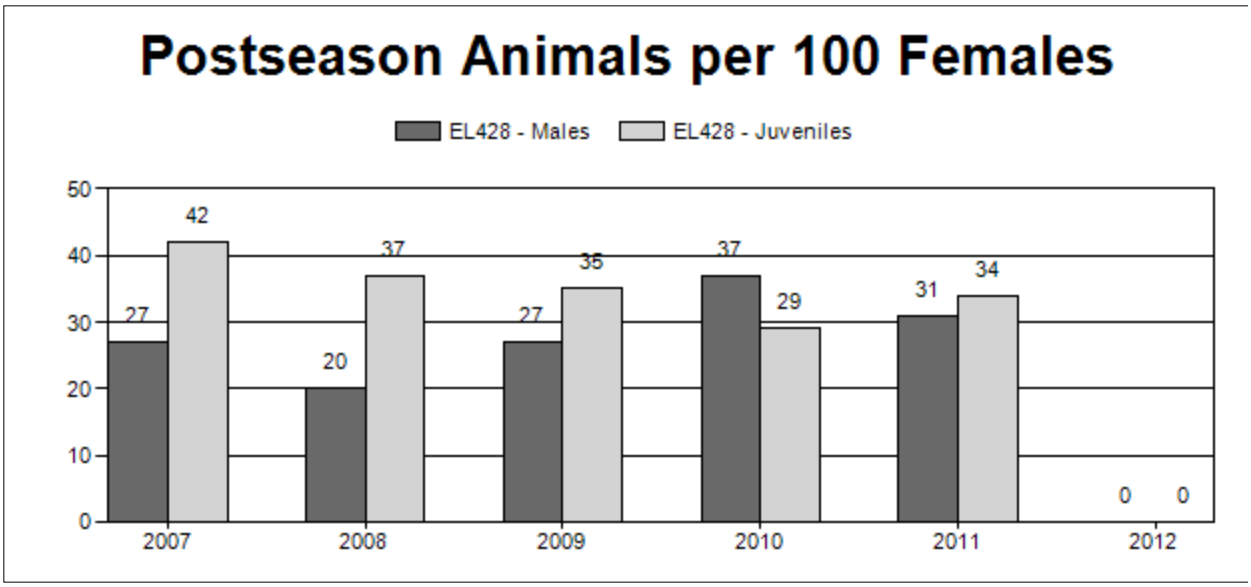

Harvest
EL428 - BULLS
EL428 - SPIKE
EL428 - FEMALES
EL428 - JUV
2000
1500
1000
500
0
451
167
491
144
1,253
403
108
456
132
1,099
469
167
651
179
1,466
433
112
851
212
1,608
395
73
421
163
1,052
490
71
771
95
1,427
2007
2008
2009
2010
2011
2012


Number of Hunters
EL428 - TOT
EL428 - RES
EL428 - NONRES
5000
4000
3000
2000
1000
0
3,213
2,931
282
3,879
3,405
474
4,089
3,591
498
4,161
3,556
605
4,159
3,488
671
4,344
3,719
625
2007
2008
2009
2010
2011
2012


Harvest Success
EL428 - Hunter Success %
EL428 - Active License Success %
40
30
20
10
0
39
38
28
27
36
34
39
37
25
25
33
31
2007
2008
2009
2010
2011
2012


Active Licenses
EL428 - Active Licenses
5000
4000
3000
2000
1000
0
3,255
4,009
4,317
4,351
4,286
4,541
2007
2008
2009
2010
2011
2012


Days per Animal Harvested
EL428 - Days
30
25
20
15
10
5
0
14.7
23.7
20
19.2
29.4
21.3
2007
2008
2009
2010
2011
2012


Postseason Animals per 100 Females
EL428 - Males
EL428 - Juveniles
50
40
30
20
10
0
27
42
20
37
27
35
37
29
31
34
0
0
2007
2008
2009
2010
2011
2012

2007 - 2012 Postseason Classification Summary

for Elk Herd EL428 - WEST GREEN RIVER

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2007	6,832	323	247	570	16%	2,080	59%	883	25%	3,533	0	16	12	27	± 1	42	± 2	33
2008	6,791	377	199	576	13%	2,894	64%	1,060	23%	4,530	0	13	7	20	± 1	37	± 1	31
2009	6,447	286	242	528	17%	1,921	62%	672	22%	3,121	0	15	13	27	± 1	35	± 1	27
2010	5,630	265	264	529	22%	1,424	60%	409	17%	2,362	0	19	19	37	± 2	29	± 2	21
2011	5,512	385	474	859	19%	2,758	61%	929	20%	4,546	0	14	17	31	± 1	34	± 1	26
2012	4,746	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0

2013 HUNTING SEASONS

SPECIES : Elk

HERD UNIT : West Green River (428)
HUNT AREAS: 102, 103, 104, 105

Hunt Area	Type	Dates of Seasons Opens	Closes	Limited Quota	Limitations
102		Oct. 15	Oct. 24		General license; any elk
		Oct. 25	Nov. 30		General license; antlerless elk
	6	Oct. 15	Nov. 30	500	Limited quota licenses; cow or calf
		Dec. 7	Dec. 15		Unused Area 102 Type 6 licenses
	7	Dec. 15	Jan. 31	25	Limited quota licenses; cow or calf
103		Oct. 15	Oct. 24		General license; any elk
		Oct. 25	Nov. 30		General license; antlerless elk
	6	Oct. 15	Nov. 30	100	Limited quota licenses; cow or calf
		Dec. 15	Jan. 31		Unused Area 103 Type 6 licenses
104		Oct. 15	Oct. 24		General license; any elk
		Oct. 25	Nov. 30		General license; antlerless elk
	6	Oct. 15	Nov. 30	500	Limited quota licenses; cow or calf
		Dec. 7	Dec. 15		Unused Area 104 Type 6 licenses
	7	Dec. 15	Jan. 31	50	Limited quota licenses; cow or calf
		Jan. 1	Jan. 31		Unused Area 104 Type 7 licenses valid west of U.S. Highway 30 and east of Lincoln County Road 207
105		Oct. 15	Oct. 31		General license; any elk
102-105	Archery	Sept. 1	Sept. 30		Refer to Section 3 of this chapter

Hunt Area	License Type	Quota change from 2012
Herd Unit Total		None

Management Evaluation

Current Postseason Population Management Objective: 3,100
Management Strategy: Recreation
2012 Postseason Population Estimate: ~4,746
2013 Proposed Postseason Population Estimate: ~3,780

Herd Unit Issues

Energy development on crucial elk habitat is a looming issue for this herd. As an unfed elk herd in Western Wyoming, habitat integrity is of critical importance. Additionally, conflict with agriculture producers is a primary issue for this elk herd. Damage complaints typically occur during bad winters. Elk comingling with livestock during winter can be an issue in limited areas. Problems have typically been dealt with if the Department was notified. The area was recently added to the Brucellosis Surveillance Area. Even though the area has a very low brucellosis prevalence in elk, this adds additional concern over elk and cattle comingling. No positive samples were collected in 2012. Summer damage is rare. Significant efforts have been made by field personnel to alleviate problems. Perceived reduction in livestock forage due to elk grazing is an issue frequently raised by some producers.

In the last two hunting seasons hunters commonly complained that elk numbers were down significantly and were too low for their standards. However, we are still over the set objective. This herd recently went through an objective review in 2012 and it was determined that the objective should remain at 3,100 mainly due to input from agriculture producers.

In recent years elk moving onto Fossil Butte National Monument prior to the season has increased, and is estimated to be 300 to 500 animals. Radio collar data indicates that a significant number of the marked animals moved back onto FBNM in early September, near the beginning of archery season. Additionally 100+ head of elk have stayed yearlong on Cokeville Meadows National Wildlife Refuge. Both the Monument and the Refuge are currently closed to hunting. As the number of elk on the Monument and the refuge increase, it will become more difficult to manage this herd to objective while still providing huntable elk for sportsmen. It is possible that the Cokeville Meadows National Wildlife Refuge may be open for elk hunting in the near future but there is no solution in sight for FBNM.

Weather

Weather during 2012 and into 2013 was extremely dry, and warmer than normal. The winters of 2011-2012 and 2012-2013 were mild with low snowpack resulting in good over winter survival. However, the dry spring and summer of 2012 negatively impacted summer and winter range forage production. Conditions were better at higher elevations but elk distribution was greatly affected.

Habitat

Habitat data collection has been inconsistently collected in this herd unit and has been absent in the recent past.

Field Data

The post season 2012 population model estimate was about 4,746 elk with the population trending downward. A fairly intensive helicopter elk flight was performed in March of 2012 with 4,791 elk observed. Flight conditions were favorable for concentrating elk. Idaho's sightability model correction was used for the survey and increased the estimate for the area flown to 4,874. The low correction factor was due to large groups of elk in high snow cover and open environments. This creates survey conditions where very few elk are missed during helicopter surveys. We flew the majority of the available elk winter range during the survey. An

additional area that was not flown due to budget constraints was thought by field personnel to contain approximately 600 elk. The addition of this information produces a total estimate of ~5,500 elk in the herd unit post season 2011.

Recent post-season bull ratios have been excellent. Calf ratios have been near average for this herd and express good production. Harvest has increased on this herd markedly over several years in an effort to reduce the herd to objective. It appears that this is working and that the herd may approach objective in the near future if harvest remains around current levels. If this holds true antlerless harvest will have to be reduced once the herd reaches objective. It is also probable that bull harvest will decline due to less elk production with a smaller herd. Additionally, it may become more difficult to maintain the bull:cow ratios hunters have become accustomed to in recent years. Another intensive helicopter survey is planned for 2014 barring projected budget limitations. This is a new sampling strategy where surveys are flown every other year, but with greater intensity. In the past classification surveys were flown on a yearly basis but with less intensity. This provided excellent classification data but did not provide an estimate of overall population size and/or trend information. The new strategy should improve overall population estimates and give us a better estimate of trend.

Harvest Data

Antlerless harvest opportunity was increased every year for several years in this herd unit. The 2010, 2011 and 2012 season structures offered substantially increased cow/calf harvest opportunity to reduce this herd. Those seasons allowed significant antlerless harvest with large increases in licenses and season lengths. These hunts had very good success rates if ample weather moved elk to winter ranges during those hunts. This management framework has reduced this population based on the dramatic population declines shown in the model and concerns voiced by the public. For 2013 we are recommending a continuation of this strategy to further reduce the herd toward objective. However, this is already unpopular with the hunting public who feel elk numbers are currently too low.

Population

The TSJ,CA model was selected due to the low Relative AICc score and its good fit with the data. The TSJ,CA, MSC model scored slightly better but there is no information to indicate that a MSC model would be appropriate for this herd and the MSC model did not fit with aerial survey data.

In the future it will be imperative that we get a reliable population estimate periodically to check the status of the herd and anchor the model. With this it is likely that we can provide a reasonable population model and track the trend of this population. Without this it will be unclear if our current harvest levels can be sustained without taking the population below objective or if we are on the right management track relative to objective.

Due to documented interchange with adjacent herd units, models generated for this herd should be viewed with some caution. This interchange has been affirmed in recent years with several radio collared elk from multiple studies crossing the herd unit border at different times of year. More radio collar studies would help determine the extent of these movements, but budget limitations will likely preclude this. In 2012 the Department switched from POP-II models to an Excel spreadsheet model. Since these are new models they are going to be under development and subject to extensive refining. They will likely change over time with new data.

Currently the model is estimating we have around 4,700 elk in the herd. This is a significant reduction in the herd over the last few years but it is still above the objective of 3,100 elk. The model predicts a post-season population of around 3,800 elk in 2013. This is a sharp decline in

population driven by harvest. This is substantiated by hunter comments and anecdotal field observations. Harvest survey data indicate that we have had more than adequate harvest in the past three years to reduce this herd and move toward objective. This supporting information gives us some confidence in model results

Management Summary

For 2013 season setting we are to continue reducing the herd toward the current objective. We will continue with hunt timing and license management to maximize elk harvest opportunities late in the season. To do this we provide a break in the hunt to placate elk and promote unhindered migration to more open winter ranges where the elk are more vulnerable to harvest. The harvest system in place should have this herd at or near objective within a couple of years.

INPUT	
Species:	Elk
Biologist:	Jeff Short
Herd Unit & No.:	WGR EL428
Model date:	02/18/13

☑ Clear form

MODELS SUMMARY

		Fit	Relative AICc	Check best model to create report
CJ,CA	Constant Juvenile & Adult Survival	1493	1502	☐ CJ,CA Model
SCJ,SCA	Semi-Constant Juvenile & Semi-Constant Adult Survival	485	502	☐ SCJ,SCA Mo
TSJ,CA	Time-Specific Juvenile & Constant Adult Survival	181	286	☑ TSJ,CA Model
TSJ,CA,MSC	Time-Specific Juv, Constant Adult Survival, Male survival coefficien	133	248	☐ TSJ,CA,MSC Model

Population Estimates from Top Model

Year	Posthunt Population Est. Field Est	Posthunt Population Est. Field SE	Trend Count	Predicted Prehunt Population Juveniles	Predicted Prehunt Population Total Males	Predicted Prehunt Population Females	Predicted Prehunt Population Total	Predicted Posthunt Population Juveniles	Predicted Posthunt Population Total Males	Predicted Posthunt Population Females	Predicted Posthunt Population Total	Objective
1993				2193	954	4769	7916	2128	483	4434	7045	3100
1994				2493	1270	5103	8867	2351	561	4709	7621	3100
1995				2137	1250	5273	8659	2110	735	4980	7825	3100
1996				2527	1346	5464	9336	2476	877	4932	8285	3100
1997				2424	1594	5527	9545	2320	1079	4777	8175	3100
1998				2199	1742	5329	9270	1949	1278	4359	7586	3100
1999				1617	1824	4813	8255	1468	1229	4216	6914	3100
2000				1768	1633	4530	7931	1592	1048	3840	6480	3100
2001				1387	1494	4203	7083	1284	1033	3785	6102	3100
2002				1532	1387	4056	6976	1417	1003	3712	6133	3100
2003				1571	1611	4239	7421	1488	1180	3903	6571	3100
2004				1793	1591	4232	7616	1650	978	3788	6416	3100
2005				1696	1561	4287	7543	1626	1142	4006	6774	3100
2006				1458	1840	4618	7916	1304	1207	4116	6628	3100
2007				1873	1758	4580	8211	1715	1078	4039	6832	3100
2008				1650	1738	4611	7999	1505	1176	4109	6791	3100
2009				1578	1818	4663	8059	1381	1119	3947	6447	3100
2010				1243	1706	4450	7399	1009	1107	3514	5630	3100
2011	5500	250		1343	1528	3863	6734	1142	980	3390	5512	3100
2012				1074	1464	3802	6340	968	839	2940	4746	3100
2013				894	1249	3287	5430	784	644	2352	3780	3100
2014												3100
2015												3100
2016												3100

Survival and Initial Population Estimates

Year	Annual Juvenile Survival Rates Model Est	Field Est	SE	Annual Adult Survival Rates Model Est	Field Est	SE
1993	0.75			0.97		
1994	0.60			0.97		
1995	0.60			0.97		
1996	0.60			0.97		
1997	0.60			0.97		
1998	0.60			0.97		
1999	0.60			0.97		
2000	0.60			0.97		
2001	0.60			0.97		
2002	0.90			0.97		
2003	0.60			0.97		
2004	0.74			0.97		
2005	0.90			0.97		
2006	0.90			0.97	0.97	0.05
2007	0.81			0.97	0.95	0.05
2008	0.90			0.97	0.95	0.05
2009	0.90			0.97		
2010	0.90			0.97		
2011	0.90			0.97		
2012	0.90			0.97		
2013	0.60			0.97		
2014						
2015						

Parameters:	Optim cells
Adult Survival =	0.970
Initial Total Male Pop/10,000 =	0.048
Initial Female Pop/10,000 =	0.443

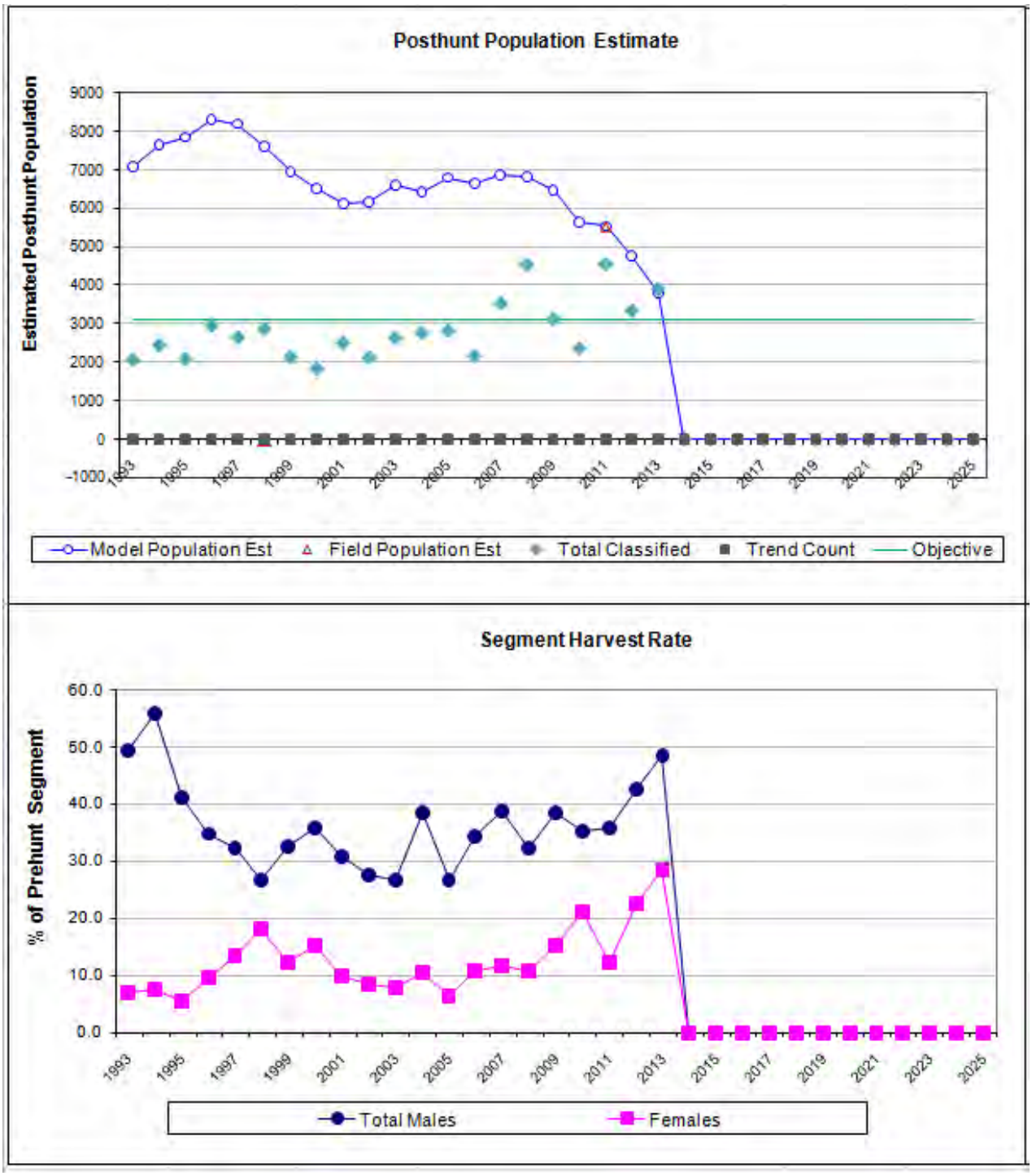
MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%
Total Bulls Adjustment Factor	100%

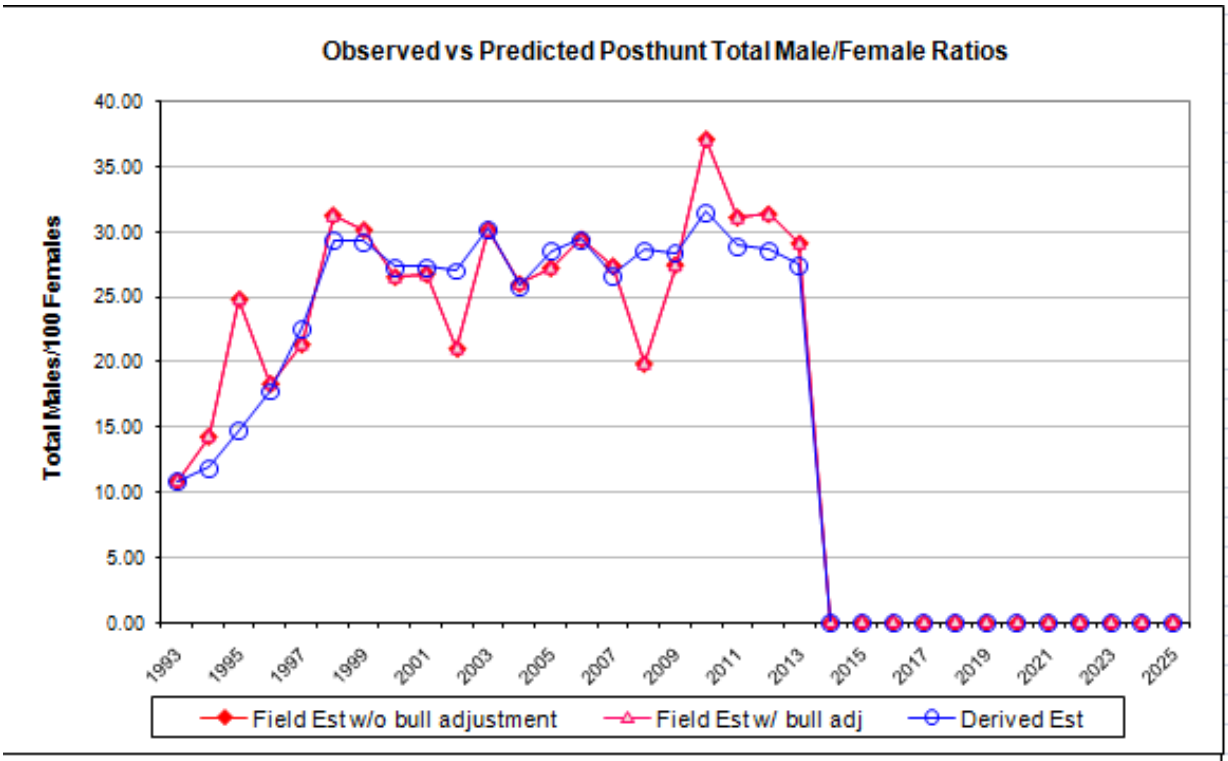
Classification Counts

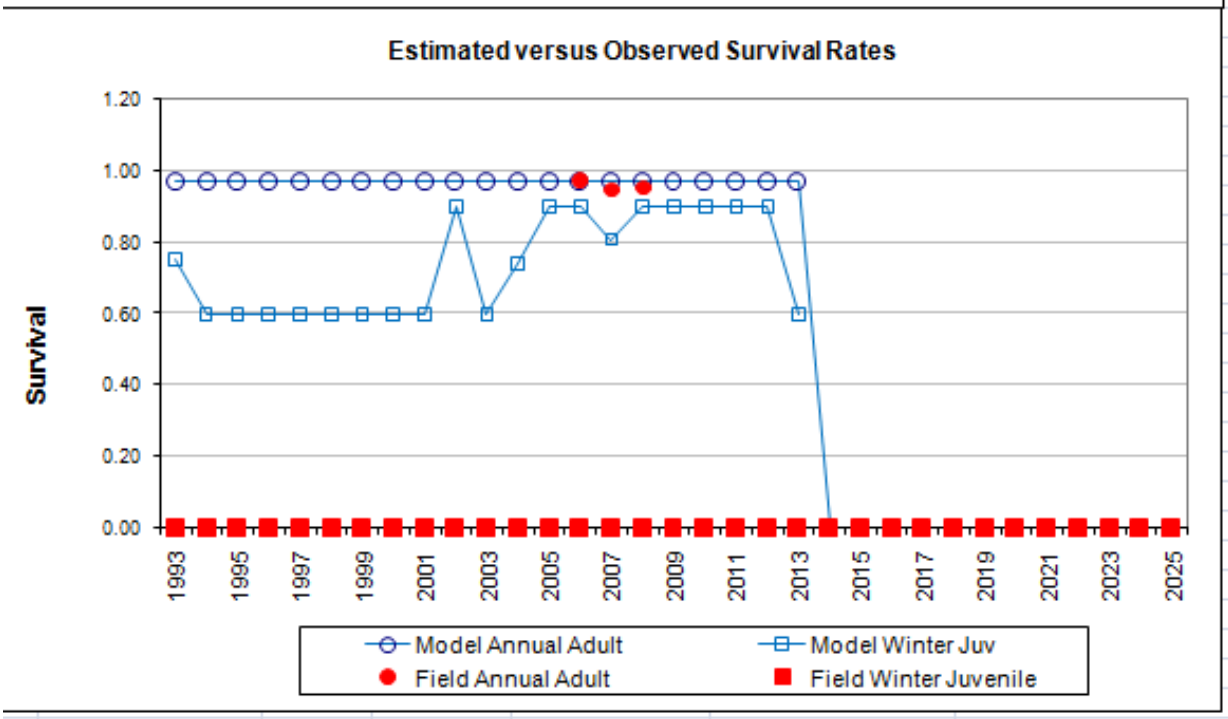
Year	Juvenile/Female Ratio Derived Est	Field Est	Field SE	Total Male/Female Ratio Derived Est	Field Est w/ bull adj	Field Est w/o bull adj	Field SE
1993		47.99	2.34	10.89	10.90	10.90	0.97
1994		49.93	2.24	11.91	14.31	14.31	1.05
1995		42.37	2.20	14.75	24.86	24.86	1.58
1996		50.20	2.07	17.78	18.37	18.37	1.11
1997		48.56	2.15	22.58	21.40	21.40	1.29
1998		44.71	1.99	29.32	31.30	31.30	1.59
1999		34.83	1.91	29.16	30.19	30.19	1.74
2000		41.46	2.31	27.28	26.58	26.58	1.75
2001		33.93	1.71	27.30	26.80	26.80	1.48
2002		38.18	1.99	27.03	21.08	21.08	1.38
2003		38.11	1.83	30.23	30.21	30.21	1.58
2004		43.55	1.96	25.82	26.04	26.04	1.42
2005		40.60	1.84	28.51	27.26	27.26	1.44
2006		31.69	1.76	29.32	29.46	29.46	1.69
2007		42.45	1.71	26.69	27.40	27.40	1.30
2008		36.63	1.31	28.62	19.90	19.90	0.91
2009		34.98	1.57	28.34	27.49	27.49	1.35
2010		28.72	1.61	31.50	37.15	37.15	1.89
2011		33.68	1.28	28.91	31.15	31.15	1.22
2012		32.93	1.47	28.53	31.39	31.39	1.42
2013		33.33	1.36	27.38	29.17	29.17	1.25
2014							

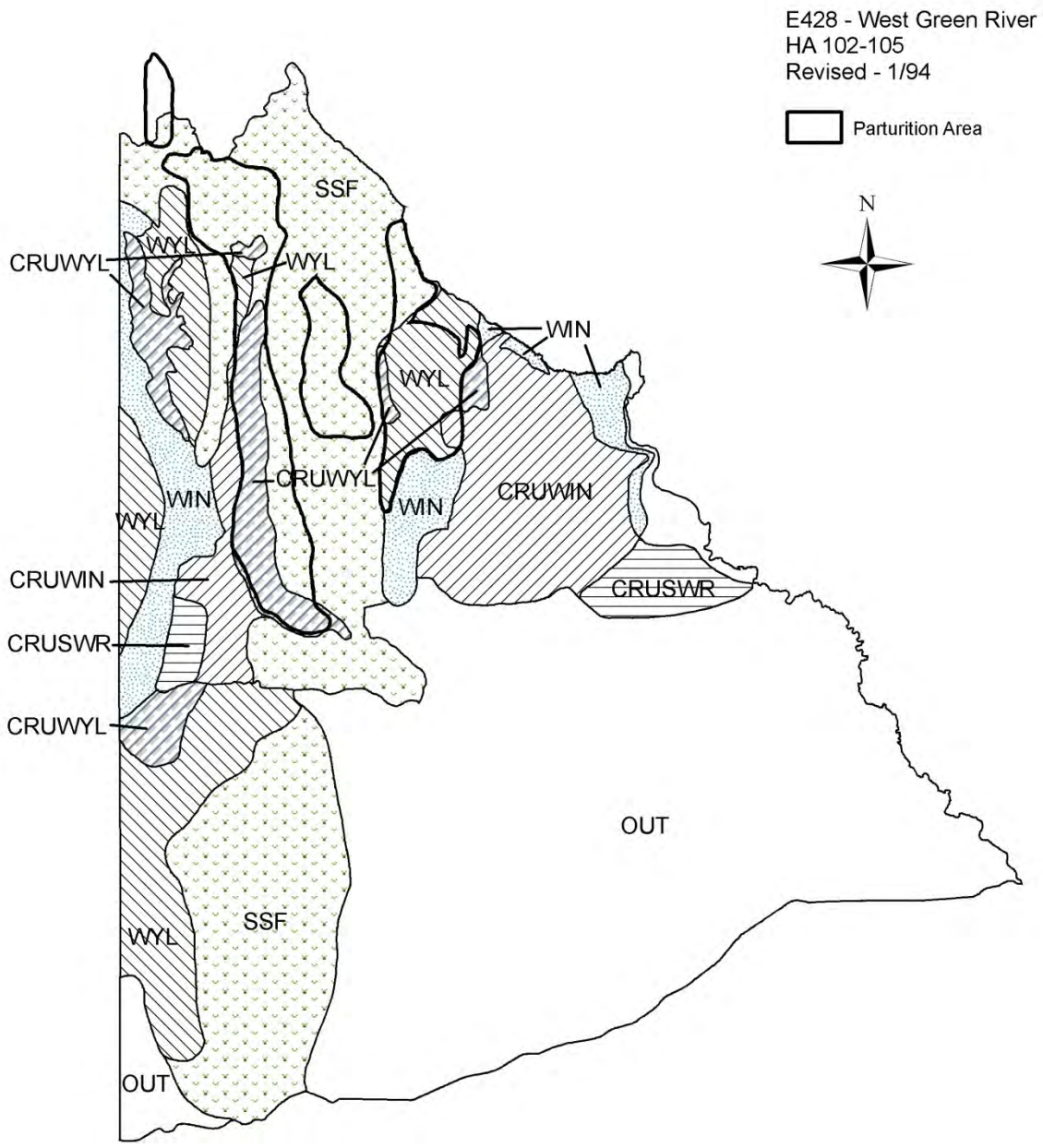
Harvest

Year	Juv	Yrl males	2+ Males	Females	Total Harvest	Segment Harvest Rate (% of Prehunt) Total Males	Females
1993	59	158	270	304	791	49.4	7.0
1994	129	260	385	359	1133	55.8	7.7
1995	25	194	274	266	759	41.2	5.5
1996	46	192	234	483	955	34.8	9.7
1997	95	190	278	682	1245	32.3	13.6
1998	227	166	256	882	1531	26.6	18.2
1999	135	172	369	543	1219	32.6	12.4
2000	160	153	379	627	1319	35.8	15.2
2001	93	88	331	380	892	30.9	9.9
2002	104	99	250	313	766	27.7	8.5
2003	76	100	292	305	773	26.8	7.9
2004	130	128	429	404	1091	38.5	10.5
2005	63	117	264	255	699	26.8	6.5
2006	140	138	437	456	1171	34.4	10.9
2007	144	167	451	491	1253	38.7	11.8
2008	132	108	403	456	1099	32.3	10.9
2009	179	167	469	651	1466	38.5	15.4
2010	212	112	433	851	1608	35.1	21.0
2011	183	74	424	430	1111	35.9	12.2
2012	96	75	494	784	1449	42.7	22.7
2013	100	100	450	850	1500	48.4	28.4
2014							


Posthunt Population Estimate
Estimated Posthunt Population
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
-1000
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
Model Population Est
Field Population Est
Total Classified
Trend Count
Objective
Segment Harvest Rate
% of Prehunt Segment
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Total Males
Females


Observed vs Predicted Posthunt Total Male/Female Ratios
Total Males/100 Females
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
Field Est w/o bull adjustment
Field Est w/ bull adj
Derived Est


Estimated versus Observed Survival Rates
Survival
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
Model Annual Adult
Model Winter Juv
Field Annual Adult
Field Winter Juvenile


E428 - West Green River
HA 102-105
Revised - 1/94
Parturition Area
N
SSF
WYL
CRUWYL
WYL
WIN
WYL
CRUWYL
WIN
WYL
WIN
CRUWIN
CRUWIN
CRUSWR
CRUSWR
CRUWYL
OUT
SSF
WYL
OUT

2012 - JCR Evaluation Form

SPECIES: Elk | PERIOD: 6/1/2012 - 5/31/2013

HERD: EL430 - PETITION

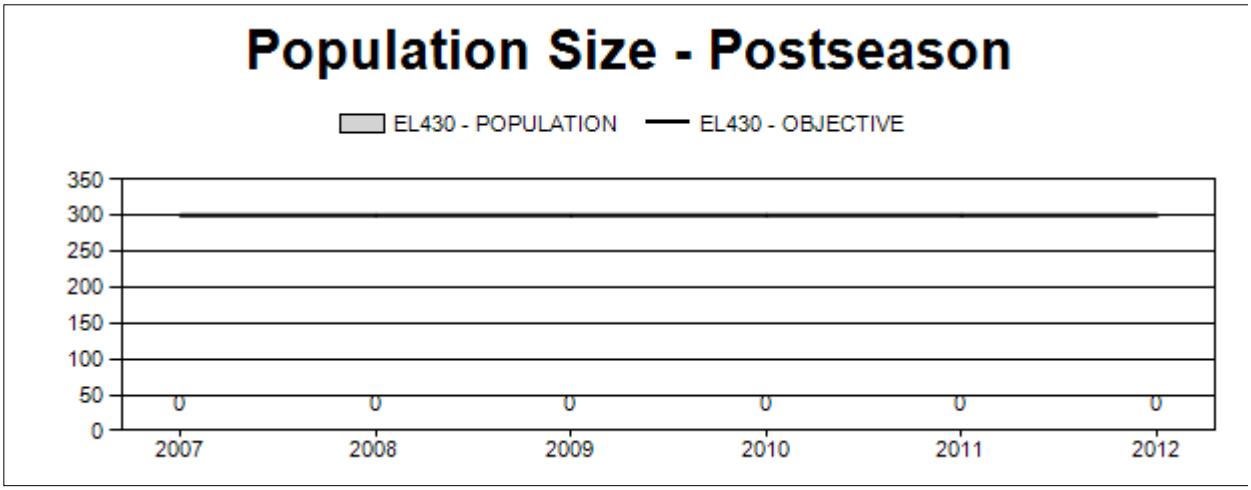
HUNT AREAS: 124 | PREPARED BY: TONY MONG

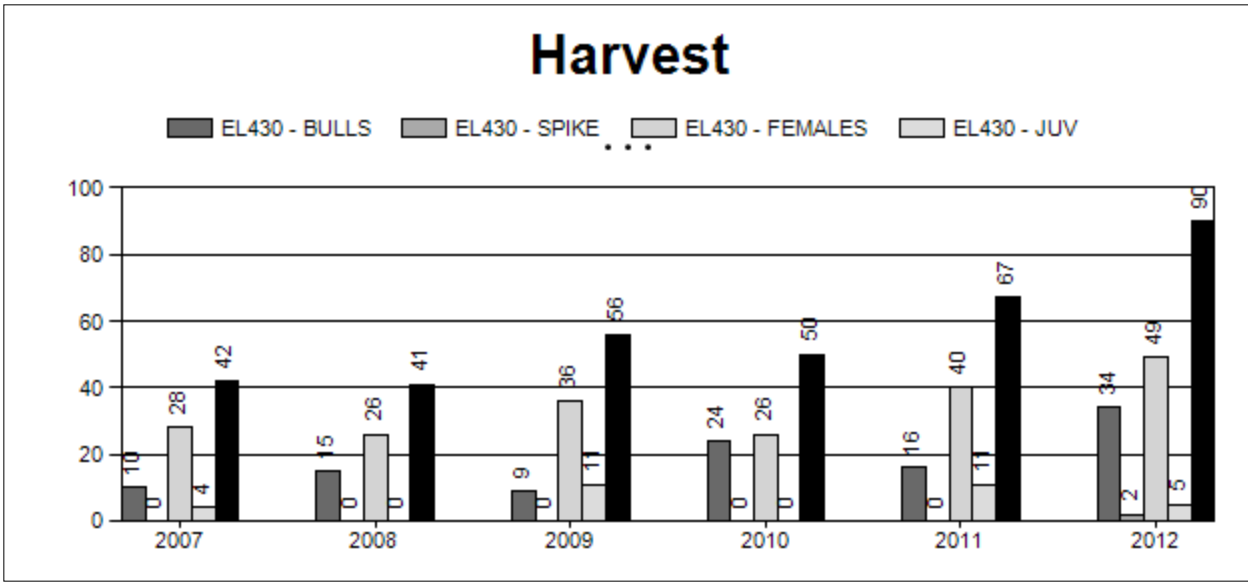
	2007 - 2011 Average	2012	2013 Proposed
Population:	0	N/A	N/A
Harvest:	51	90	91
Hunters:	92	135	132
Hunter Success:	55%	67%	69%
Active Licenses:	92	135	132
Active License Percent:	55%	67%	69%
Recreation Days:	682	977	991
Days Per Animal:	13.4	10.9	10.9
Males per 100 Females	0	0	
Juveniles per 100 Females	0	250	

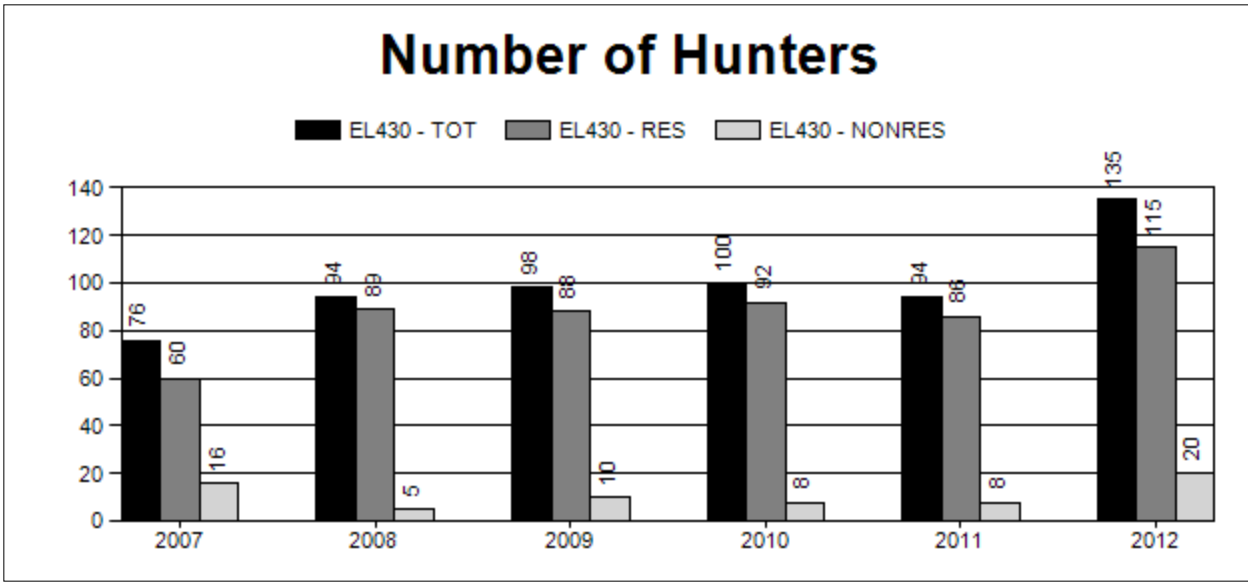
Population Objective:	300
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	N/A%
Number of years population has been + or - objective in recent trend:	0
Model Date:	None

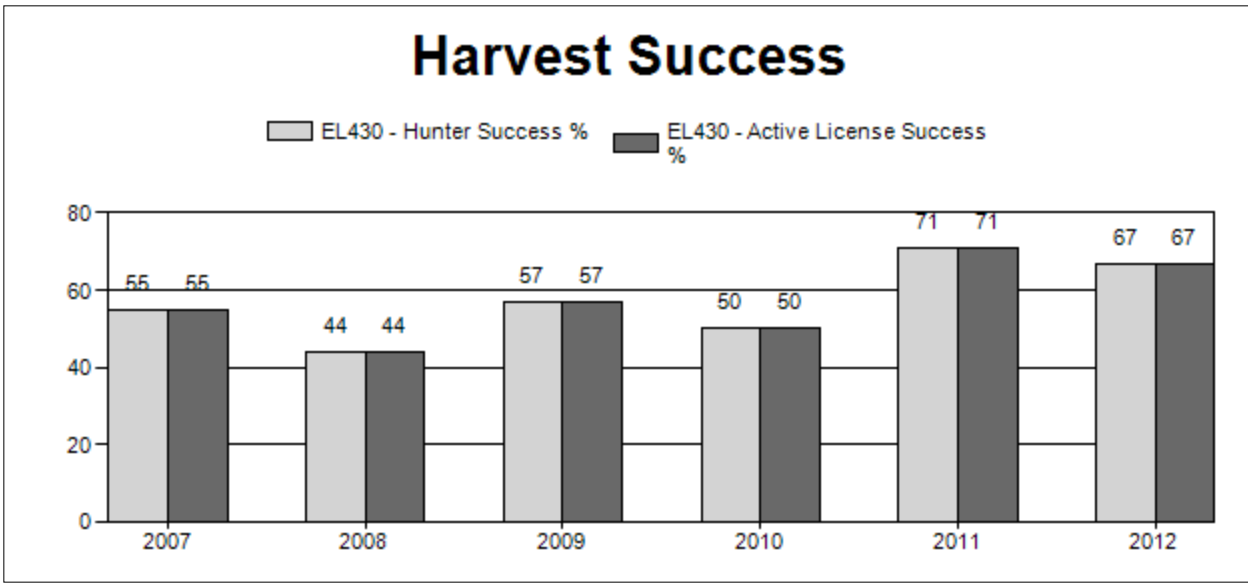
Proposed harvest rates (percent of pre-season estimate for each sex/age group):

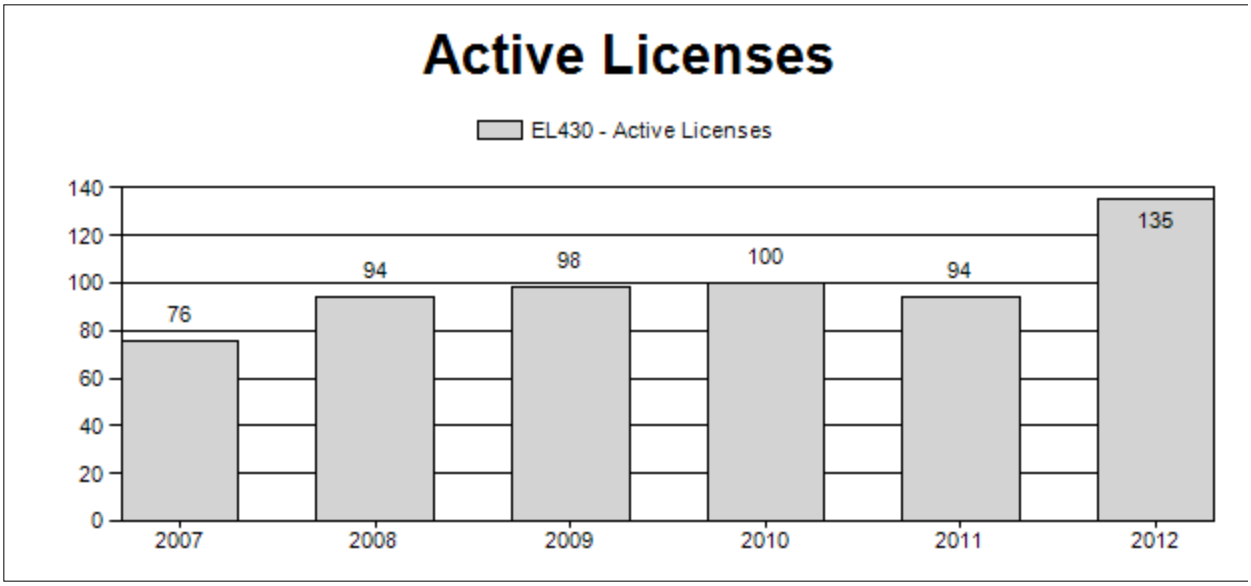
	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	0%	0%
Juveniles (< 1 year old):	0%	0%
Total:	0%	0%
Proposed change in post-season population:	0%	0%

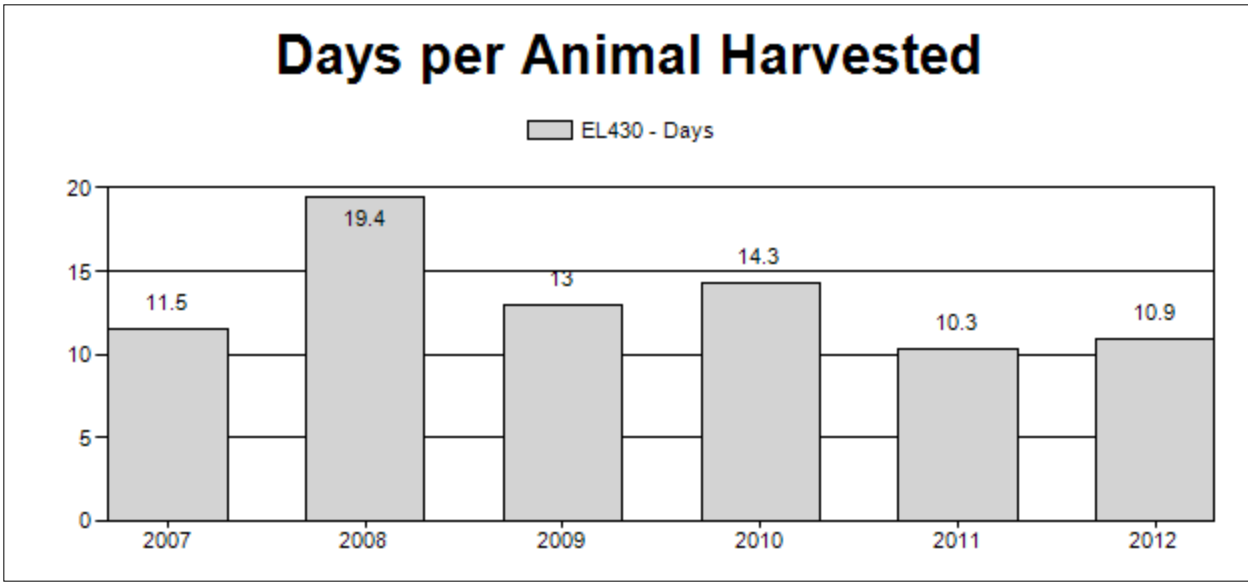


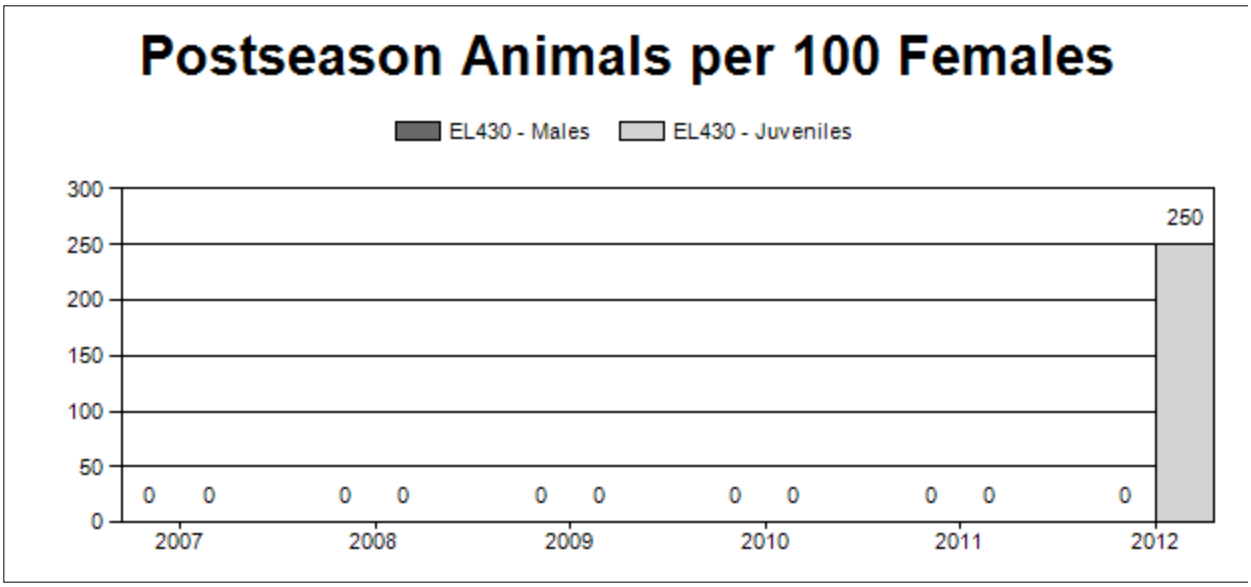

Harvest
EL430 - BULLS
EL430 - SPIKE
EL430 - FEMALES
EL430 - JUV
100
80
60
40
20
0
10
0
28
4
42
15
0
26
0
41
9
0
36
11
56
24
0
26
0
50
16
0
40
11
67
34
2
49
5
90
2007
2008
2009
2010
2011
2012


Number of Hunters
EL430 - TOT
EL430 - RES
EL430 - NONRES
140
120
100
80
60
40
20
0
76
60
16
94
89
5
98
88
10
100
92
8
94
86
8
135
115
20
2007
2008
2009
2010
2011
2012


Harvest Success
EL430 - Hunter Success %
EL430 - Active License Success %
80
60
40
20
0
55
55
44
44
57
57
50
50
71
71
67
67
2007
2008
2009
2010
2011
2012


Active Licenses
EL430 - Active Licenses
140
120
100
80
60
40
20
0
76
94
98
100
94
135
2007
2008
2009
2010
2011
2012


Days per Animal Harvested
EL430 - Days
20
15
10
5
0
11.5
19.4
13
14.3
10.3
10.9
2007
2008
2009
2010
2011
2012


Postseason Animals per 100 Females
EL430 - Males
EL430 - Juveniles
300
250
200
150
100
50
0
0 0
0 0
0 0
0 0
0 0
0
250
2007
2008
2009
2010
2011
2012

2013 HUNTING SEASONS

SPECIES : **Elk** HERD UNIT : **Petition (430)**
HUNT AREAS: **124**

Hunt Area	Type	Open	Close	Quota	Limitations
124	1	Oct. 15	Nov. 30	40	Limited quota; any elk
	4	Oct. 15	Nov. 30	100	Limited quota; antlerless elk
	Archery	Sept. 1	Sept. 30		Refer to Section 3

Hunt Area	Type	Quota change from 2012
124	1	-5
Total	**1**	**-5**

Management Evaluation

Current Management Objective: 250-350

Management Strategy: Recreational

2012 Postseason Population Estimate: N/A

2013 Proposed Postseason Population Estimate: N/A

Herd Unit Issues

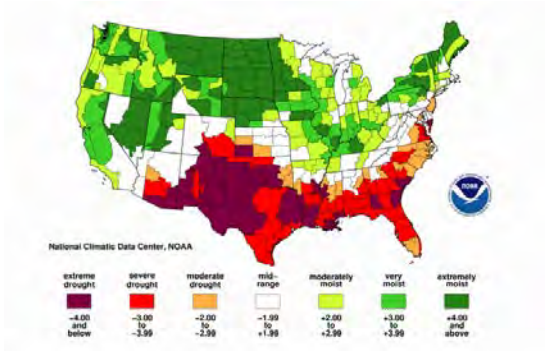
The Petition elk herd is a small, highly mobile herd spread over a large area. A large amount of interchange occurs with Colorado, and possibly South Rock Springs Elk (EL424), making meaningful data collection and population estimation difficult, and extremely costly. Limited flight budgets result in expenditure of these funds in herds that support larger numbers and hunter harvest. The current management objective was established in 1999 and was set as a range of 250-350 animals.

Weather

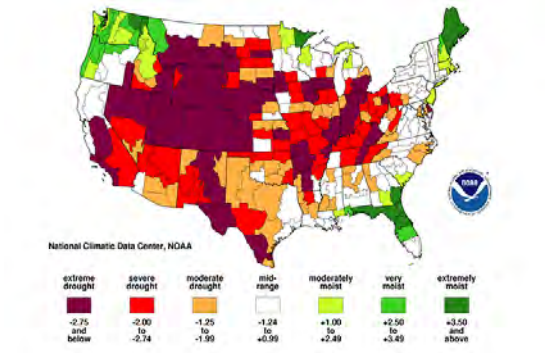
Within the past several years we have seen extreme weather fluctuations in this area, which likely represents the norm in southwestern Wyoming. In 2010-11 moisture levels were at record highs with high snow levels, followed in 2011-12 with record drought conditions and low snow levels (Figure 1).

Figure 1. A) Palmer short-term drought index from June 2011. B) Palmer short-term drought index from June 2012

A)



B)



Field and Harvest Data

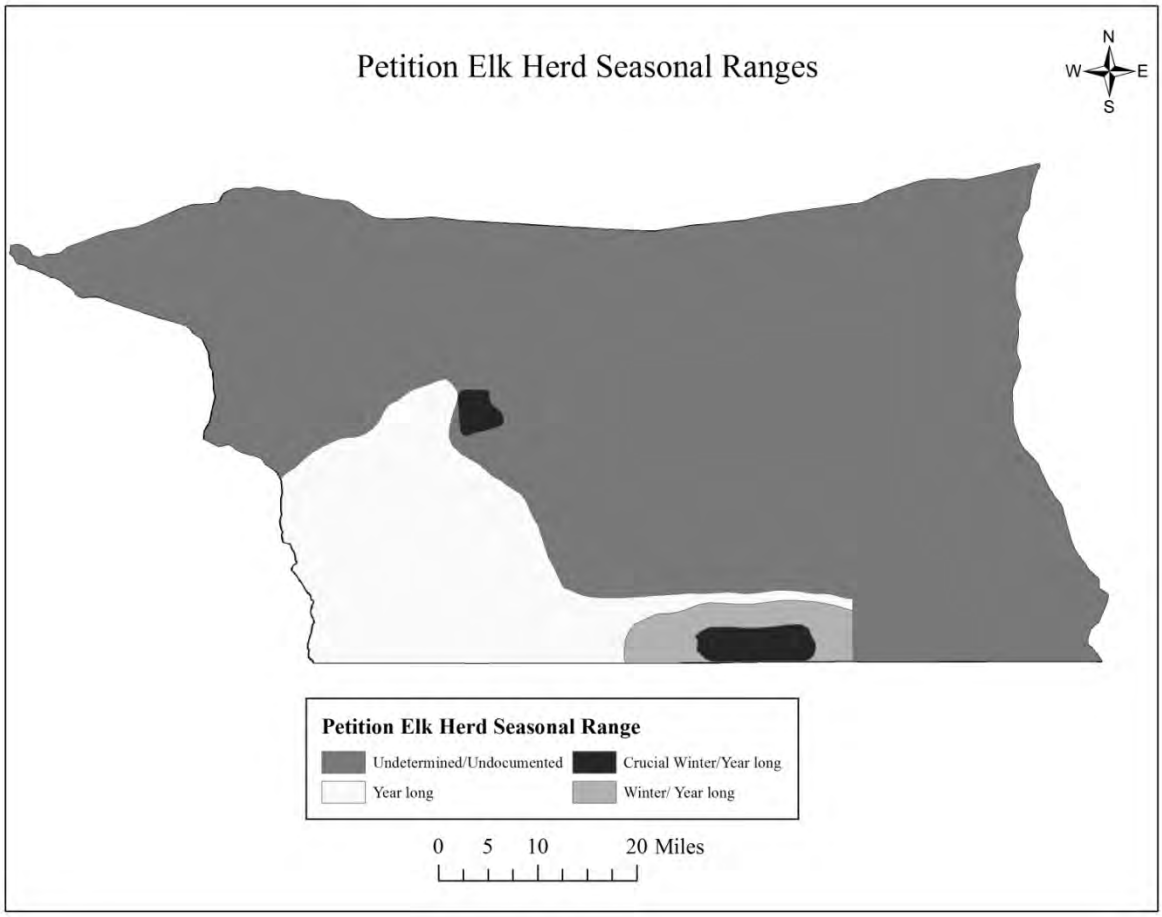
No population data is currently collected for this herd, which makes management more difficult. However, personnel observations, public input, and harvest data lead us to believe this herd has grown in both numbers and distribution since elk moved to the area in the early 1990s. Field checks and pre-season setting meetings have suggested that many hunters that have hunted in HA 124 are seeing more elk than they did historically. Harvest success for the herd unit has been very high during the past 2 years indicating that hunters are finding the animals they would like to harvest.

Despite the lack of population data, a majority of hunters encountered in the field and those that attended preseason setting meetings indicated concern with the increase in elk numbers in HA 124, but were not happy with the increase in the bull licenses that occurred in 2012. This herd has become a premiere bull hunting opportunity because of the size of animals being taken. It is important that we balance the management of an important resource to hunters (i.e. good opportunity for large bulls) and the extremely sensitive ecosystem found in the Petition elk herd. This herd unit overlaps the Bitter Creek pronghorn and a portion of the Baggs and South Rock Springs mule deer herd units, and elk are likely contributing to the inability of these herd units to increase.

Management Summary

The proposed hunting seasons in 2013 will continue to harvest antlerless elk and a higher rate than bulls to achieve desired management objectives. This will continue to reduce overall elk

numbers in this area but will allow bulls to reach the older age classes the public desires for the herd unit.


Petition Elk Herd Seasonal Ranges
N
W
E
S
Petition Elk Herd Seasonal Range
Undetermined/Undocumented
Crucial Winter/Year long
Year long
Winter/ Year long
0 5 10 20 Miles